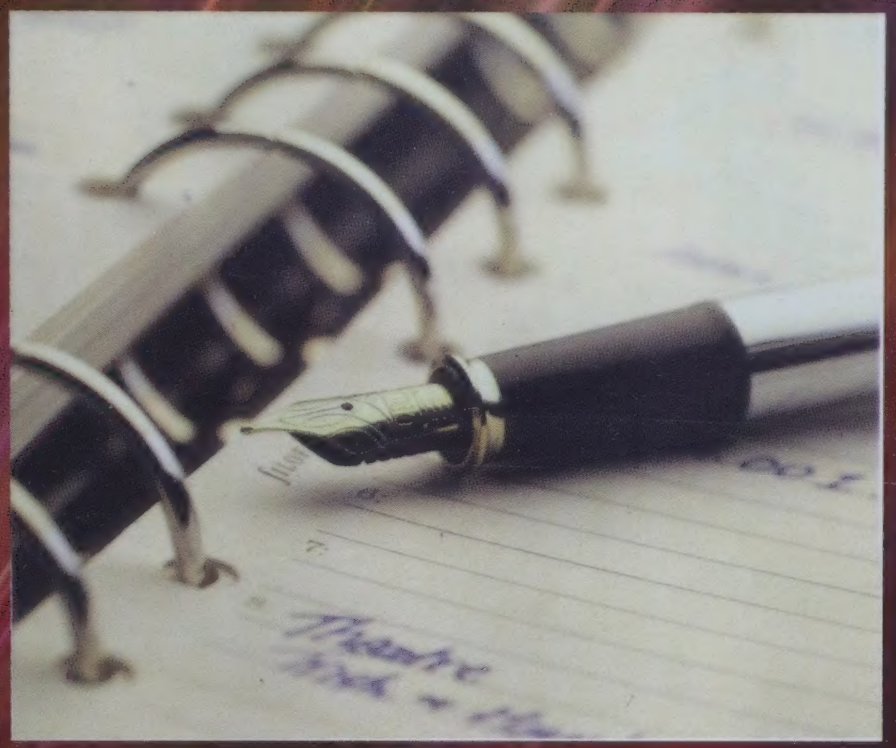

THE
TAMIL NADU HIV SENTINEL SURVEILLANCE
REPORT - 2004

Tamil Nadu State AIDS Control Society, (TANSACS),
Government of Tamil Nadu, INDIA

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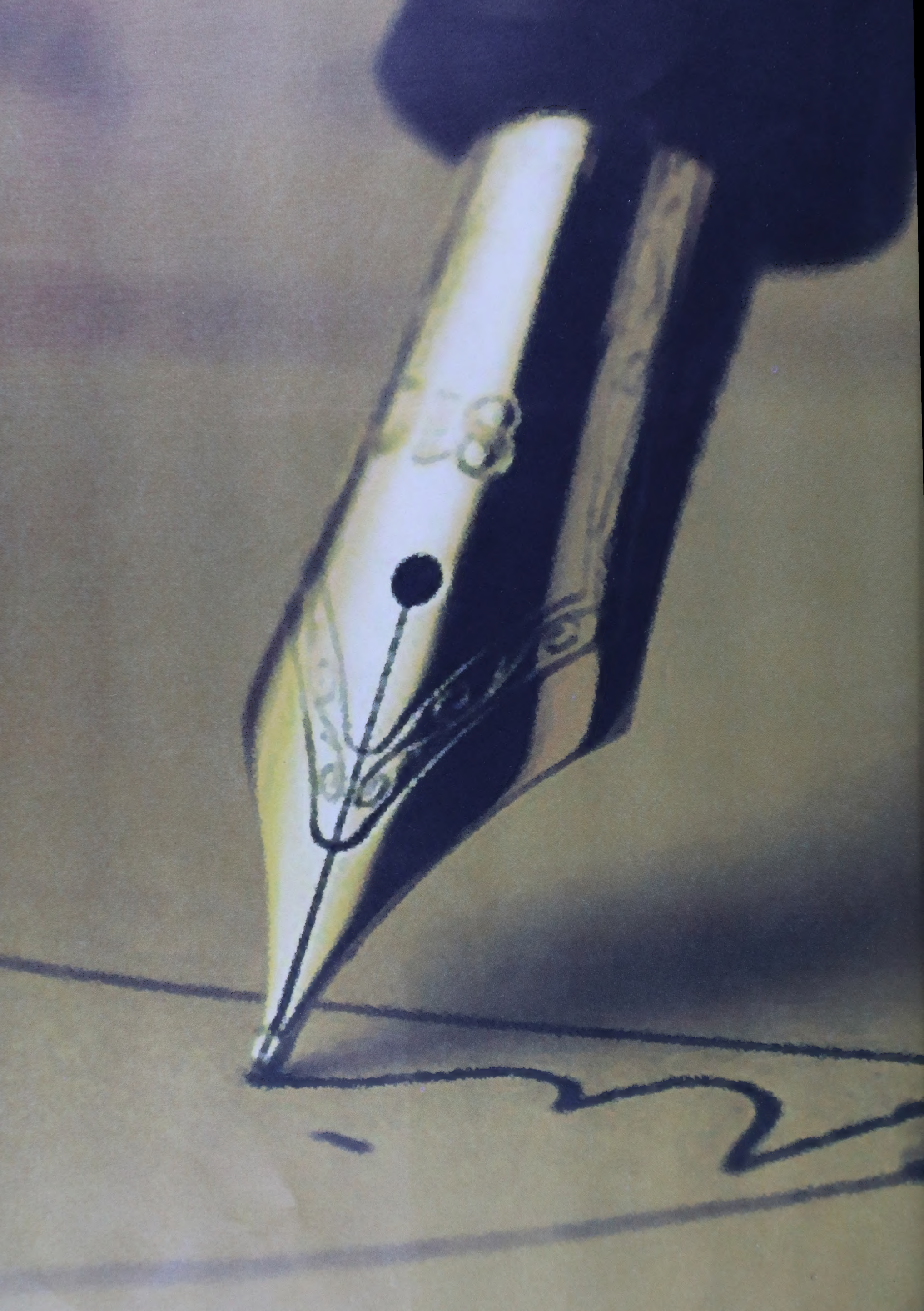

foreword

S.VIJAYAKUMAR, I.A.S.,
Project Director
Tamil Nadu State AIDS Control Society (TANSACS)

Tamilnadu is considered as one among the high Prevalence States. The infection was detected in the year 1986 and attained its peak in the year 2001, which was reflected in the prevalence rate of 1.13% among the antenatal mothers. Tamilnadu is the first State to respond to this epidemic promptly in a systematic way. The State has proven initiatives provided by all partners, which are being emulated by other regions in the country.

The sentinel surveillance is being conducted every year to find out the trend of HIV infection in the State, which demonstrates to a larger extent the impact of various types of interventions carried out to stall its progress. In 2004, the sentinel surveillance was conducted from July to September in a systematic way, adequately covering all the segments of population in 85 sites. Out of them 69 were sites for ANC mothers, 11 sites for STD patients, 2 sites for MSM population, and 1 site each for CSW, IDUI and TB patients.

The sentinel surveillance report has brought out many salient findings. The prevalence stands at 0.65% among antenatal mothers. For the past three years, the State has shown a continuous downward trend in the prevalence and this reduction is corroborated by the reports received from PPTCT. The analysis has shown at the epidemic is not homogeneous throughout the State, showing certain pockets of concentration. Besides, it has shown the need for a focal intervention on new target groups such as hotel workers, service sector, etc.

The sentinel surveillance report 2004 is more analytical. This provides information to all the section such as policy makers, scientific community and the general public. I congratulate **Dr. M.D. Gupte**, Director, National Institute of Epidemiology and the Chairman, Working Group on Data Management, HIV / AIDS Consortium of Tamil Nadu for authoring this book. The surveillance information is presented in a clear and simple manner, enabling all the segments of the population to clearly understand the status and factors of the epidemic in the State. Another interesting feature of the report is the EPP modeling of the epidemic, which is used worldwide to project the epidemic. This model has shown that the epidemic is on the downward trend in Tamil Nadu.

I appreciate Dr. Senthamizhan, then Joint Director (EPI), TANSACS for conducting the surveillance and all the medical officers, laboratory technicians, NGOs and others who were involved in the data collection process.

I wish to thank all the partners of the HIV / AIDS Consortium of Tamil Nadu who have provided valuable inputs during the preparation of the book and Mr. Elangovan, Asst. Director, NIE for assisting Dr. Gupte in the analysis, mapping and estimation process.

Finally, I place on record my sincere appreciation to the TANSACS team, Dr. Jagadeesan, Dr. Kuganandam, Dr. Ravibabu, Dr. Maharajan, Dr. Regina Papa, Ms. Shoba, Mr. Ezhil Pari, Ms. Malarkodi Sugumaran, Ms. Padmavathi, Mr. Subbiah, Mr. Murugan, Ms. Vanmathi, Mr. Gowthaman and statistical team for data management for their contributions in bringing out this report.

S. VIJAYAKUMAR, I.A.S.,

PREFACE

Mr. S. Vijayakumar, Project Director, Tamilnadu AIDS Control Society requested me to analyze the 2004 sentinel surveillance data for the state of Tamilnadu. It was an interesting task. In the context of a projected success story of HIV control activities in the state, this was a challenging task as well. Data was available from 69 ANC sites, II STD sites and 5 sites for other high risk groups. I had access to earlier reports and data from APAC. Dr. M. Jagadeesan, Consultant, M and E, TANSACS, provided the preliminary tabulation and worked with me most willingly to produce this report. Mr. A. Elangovan, Asst. Director from NIE, did the GIS, modeling and other important data management work helping thus in better projection and analysis of the data. The Project Director of TANSACS gave free hand and access and was most patient and encouraging in preparation of this report. Findings of this analysis were presented in a Consortium Meeting at the Tamilnadu State Aids Control Society. I was also fortunate to get comments from Dr. Sanjay Mehendale, Deputy Director (Sr. Grade), National AIDS Research Institute, Pune. Comments received from the Consortium and Dr. Sanjay Mehendale were considered while finalizing the report.

It was important to understand this varied epidemic, perhaps with different starting points. Central region of the state is the most affected part. Efforts put in by various agencies to control the spread seem to be yielding the fruits, though there are challenges. It is necessary to ascertain the stabilization or downward trend at least for a few more years. Contributions made by AIDS control programme and NGOs will have to be assessed to decide on the future directions. To what extent the enabling environment contributed to get handle on this epidemic? In India, prevalence of sexually transmitted infections is expected to be between 5 and 10%. HIV is one of the sexually transmitted infections. In the long run it should find its own niche in the STI compartment. HIV is not a very efficient virus for transmission and with cultural milieu of South India, the infection may remain self limited. So this scenario could be simply a natural phenomenon. There could be several such factors to be understood.

AIDS control activity now needs to proceed from project to programme to a mission mode. I hope this report will help in charting the right path towards an effective and sustained activity in the coming years.

M.D. GUPTE

...I hope this report will help in charting the right path...

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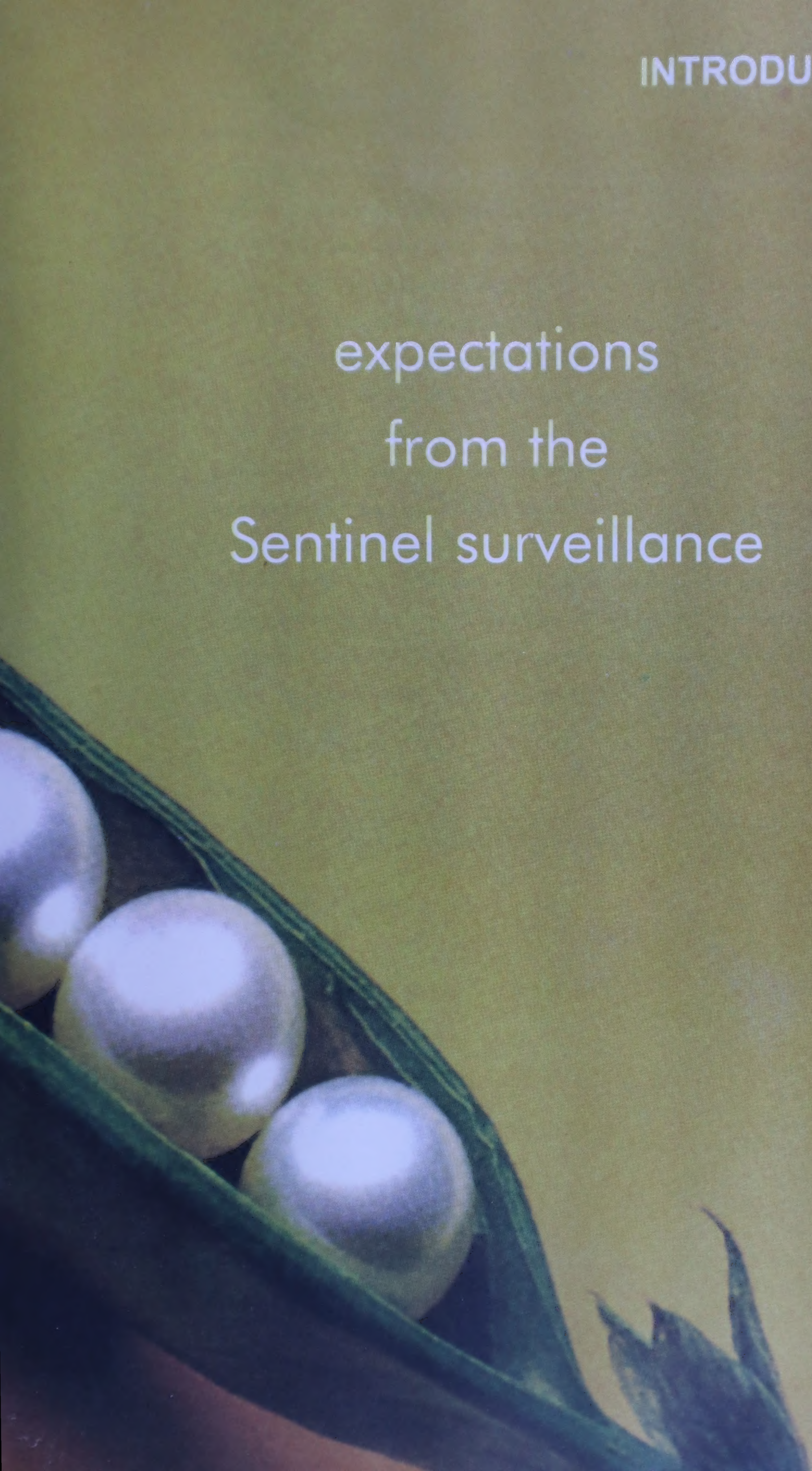
expectations
from the
Sentinel surveillance

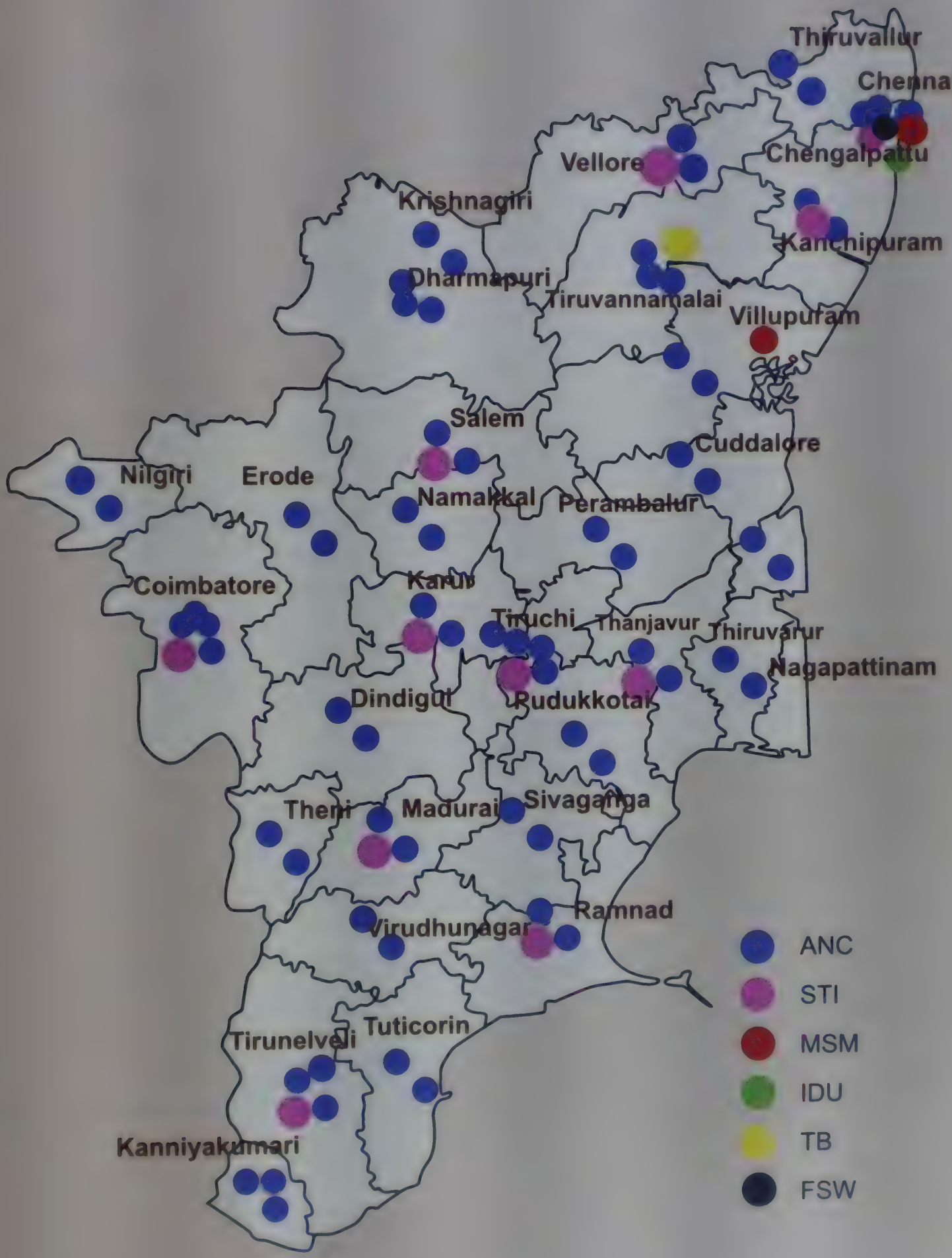


The word sentinel means a "watch dog" or a "senior guard" whose job is to keep a vigil. In the context of HIV, sentinel surveillance was expected to provide information on entry of HIV into the country at various points in geographical context over a period of time. Sentinel surveillance is also expected to provide information regarding trend of HIV over space and time. Since there is no reliable information available for HIV estimates, data available through sentinel surveillance is being used to estimate the same at the national level from year to year. As seen from table 1, in the state of Tamilnadu, the number of sentinel surveillance centers has gone up from 2 in 1993 to 85 by 2004. Population for various sentinel sites is selected in a purposive manner. It is not a representative sample of the general population. Therefore it is not easy to work out estimates of HIV based on sampling theory. However, such representative type of data is not available readily almost anywhere in the country. Hence conventionally over the past years sentinel surveillance data is used for estimating HIV prevalence for the country by making several assumptions. Efforts have been made to validate these assumptions, but there are areas which would still need improvement.

Table 1: Expansion of Tamilnadu sentinel surveillance (1993 2004)

YEAR	ANC	ANC 15-24 years	ANC PVT hosp	STD	TRUCKERS	IDU	MSM	TB	FSW
1993				2					
1994	2			2	1				
1995	2			2	1			2	
1996	2			2	1			2	
1997	2			2	1			2	
1998	5			3	discontinued			2	
1999	5			3				2	
2000	5			3		1	1	discontinued	
2001	10			5		1	1		
2002	10	1		11		1	2		
2003	57	5	2	11		1	2		1
2004	59	5	5	11		1	2	1	1

Fig 1. HIV Sentinel Sites in Tamilnadu, 2004



Sentinel Surveillance in Tamil nadu

1993	-	Sentinel surveillance started in Tamilnadu with 2 STD sites. One site at Govt. Stanley Hospital Chennai and another site at Coimbatore Medical college hospital.
1994	-	Two ANC sites and one trucker site were added in to sentinel surveillance
1995	-	Surveillance of HIV infection in TB patients were added at two centers. Repeat survey was done after six months in same year
1995-1997	-	surveys conducted in same sites
1998	-	Sentinel sites were expanded. STD sites increased to 3 and ANC sites to 5 with existing 2 TB sites. Survey in 5 ANC sites were repeated after 6 months
1999	-	Survey conducted in same sites except for truckers. Site for truckers discontinued
2000	-	MSM and IVDU sites were added. TB sites discontinued.
2001	-	ANC sites increased to 10 and STD sites increased to 5.
2002	-	One ANC site was established to study 15-24 years age group along with 10 ANC sites, 11 STD sites,2 MSM and one IVDU sites. Hepatitis B and Hepatitis C were added in sentinel survey.
2003	-	ANC sites for 15-24 increased to 5 and private sites for ANC included. One site for FCSW established.
2004	-	A total of 69 ANC sites. One site for Tuberculosis

focus on targeted interventions

WHO and UNAIDS estimated 39.4 million people to be living with HIV in the world at the end of December 2004. In this year estimated 5 million persons acquired new infections and 3 million died of HIV/AIDS. As the epidemic of HIV entered the third decade, spread of HIV infection remains unabated in the world. The epidemic has caused damage at all possible walks of life. India is having localized epidemics of HIV infection. The overall rate of infection in India is about 0.9% in the adult age group. The states like Tamilnadu, Maharashtra, Andhrapradesh, Karnataka, Manipur and Nagaland are having high prevalence of infection. In the state of Tamilnadu, HIV infection was first identified in Chennai in 1986. The epidemic has by now invaded various parts of the state in both urban and rural areas. The character of the epidemic has changed from the initial invasion of high-risk populations like commercial sex workers, injecting drug users to general population with the latest trends towards feminisation. AIDS control programme in Tamilnadu is a well planned programme with focus on targeted interventions and prevention of parent to child transmission of HIV. Presently covered target groups and the three agencies are listed in table 2.

Table 2. NGOs facilities in Tamil Nadu under TANSACS, CAPACS and APAC for targetted interventions - 2004

	TANSACS	CAPACS	APAC
CSW	15	5	8
MSM	3	1	
Truckers	13	1	14
Industry	13		5
Migrant	13		
Prison	3		
Tribal	3		
Youth	1		
TWIP			6
Slum		2	9
Street children		1	
Film industry		1	
Porters		1	
TG		1	
Auto		2	
IDU		3	
Total	64	18	42

TANSACS -- Tamil Nadu State AIDS Control Society
CAPACS -- Chennai Corporation AIDS Prevention And Control Society
APAC -- AIDS Prevention And Control Project - VHS

Sentinel surveillance, 2004 was conducted in Tamil Nadu as per NACO guidelines (Annexure 1).

ANTENATAL CLINIC ATTENDEES

In the year 2004 surveillance for antenatal women was conducted in 69 sites. The sites consisted of 24 district head quarters hospitals and 6 Medical college hospitals which were located at district head quarters, 29 first referral units, 5 private nursing homes and 5 sites for the women aged 15- 24 years. For the purpose of estimations antenatal women are considered as proxy for the general population for the age group 15 to 49 years can be seen from the Fig. 2, age distribution for ANC attendees, when compared with women of general population in Tamilnadu is a mismatch.

How representative is the ANC attendees group for the general population (age group 15-49 years) for the state?. In the ANC group 84% mothers were in the age group 20 - 29 yrs as against 34% in the females in general population. There were only 4 individuals tested in the age group 45 - 49 yrs as against 10% population in the 15-49 yrs age community. HIV positivity was varying in different age groups. If we consider sero-positivity in male general population, there would be similar difficulties. This will be true for the country as a whole and deserves attention while working out estimates for HIV infection prevalence.

Another issue that deserves attention is urban-rural pattern. About 40% of Tamilnadu population now lives in urban area. The first referral units are, more often than not, urban. Urban-rural distribution for HIV prevalence is based on recorded information from the mothers at the time of blood collection. The extent of percolation of HIV infection in rural areas will need careful examination.

A total of about 27000 blood samples were collected from the 69 ANC sites out of which 223 were positive for HIV. Based on the available data, the median positivity rate or HIV infection prevalence for the sentinel ANC sites was 0.65% in the state, with a range of 0 to 3.7%. Information for various districts is given in table 3.

Fig. 2 Age distribution of ANC attendees compared with general population, Tamilnadu Sentinel Surveillance, 2004

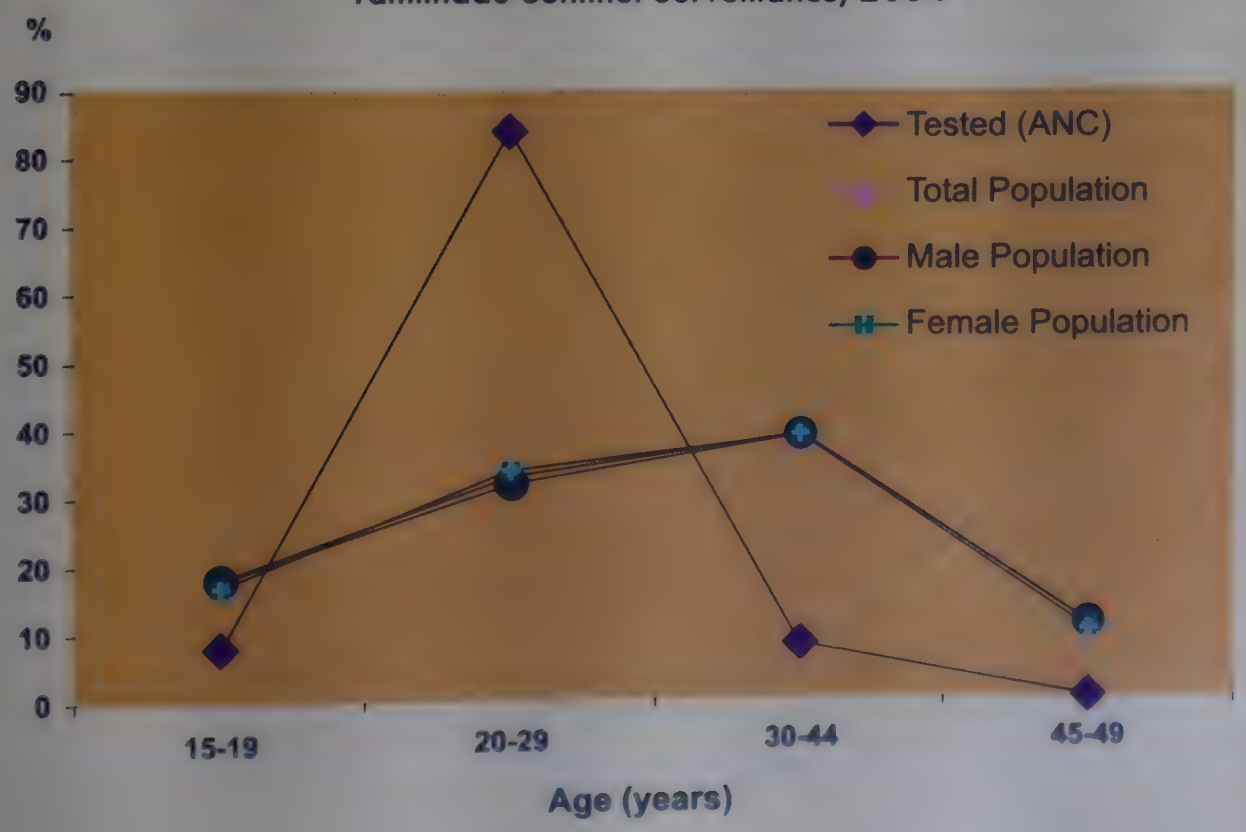


Table 3: HIV Sero-positive (%) in ANC attendees, Tamil Nadu Sentinel Surveillance Centre, 2004

Districts	Dist HQ hospital	FRU#	15-24 yrs	Private hospitals
Karur	2.5	3.25		
Salem	2	1.25		
Namakkal	2.5	0.75		
Theni	1.75	1.25		
Madurai	0.25	3.70		
Krishnagiri	1.25	1.17		
Sivaganga	0.5	1.75		
Perambalur	1.25	1.00		
Dharmapuri	1	0.50	1.25	
Villupuram	0.5	1.25		
Tiruchi	1.25	0.50	1.25	
Vellore	1	0.50		
Dindigu	0.75	0.75l		
Thoothukudi	0.5	1.00		
Thiruvannamalai	1.75	0.25		0
Thiruvallur	0.5	0.75		
Ramnad	0.75	0.50		
Pudukkotai	0.75	0.50		
Erode	0.75	0.50		
Nilgiris	0.5	0.75		
Thanjavur	0.75	0.50		
Nagapattinam	0.5	0.50		
Coimbature	0.5	0.75	0.25	0.25
Tirunelveli	0.75	0.25	0.25	
Kanyakumari	1	0.25		0
Cuddalore	0	0.75		
Virudhunagar	0.25	0.25		
Kancheepuram	0	0.50		
Chennai	0		0.25	0.25
Thiruvarur	0.25	0.00		

- FRU - First referral units

- except FRU sites at Madurai and Krishnagiri all sites collected 400 samples.
- For Madurai and Krishnagiri 189 and 171 samples respectively, were collected.

Age distribution of positive women

Table 4 gives information on age distribution for ANC attendees in the sample and HIV prevalence rates in those age groups. There is obvious need to project the disaggregated data and then use the same for projection / estimation purposes, after considering the limitations.

Table 4: HIV Prevalence Rate in ANC, Tamilnadu Sentinel Surveillance, 2004

Age & sex distribution	Population proportion (%) in the sample	HIV Prevalence (%)
Less than 20 yrs	8	0.66
20-29	84	0.83
30-44	8	1.00
45 and above	0	0.00

Table 5: Locale distribution and HIV prevalence for ANC, Tamilnadu Sentinel Surveillance, 2004

Locality	Number Tested	Number positive (%)
Rural	18644	166 (0.89)
Urban	8515	57 (0.67)
Total	27159	223 (0.82)

Place of residence was recorded as per the information provided by the study subjects. The positivity was marginally higher among rural women compared with the urban women (not significant at 5% level). Conventionally it is considered that HIV infection is more concentrated in urban population and most of the activities are urban oriented. As has been seen at the national level, the risk for HIV in Tamilnadu as well, is not low in rural areas when compared with the urban areas.

Education status of positive women

Overall data showed a higher positivity among illiterate women. However the difference was small.

Table 6: Educational status and HIV positivity in ANC, Tamilnadu Sentinel Surveillance, 2004

Educational status	Number Tested	Number Positive	Dist. HQ Hospital (%)	FRUs (%)
Illiterate	6481	60	0.94	1.02
Up to 5th std	7128	53	0.80	0.64
Till 12th	12283	101	0.87	0.83
Graduate and above	1267	9	0.80	0.57

Migration status

Women who had migrated had higher positivity than who did not migrate. This was same for both urban and rural population. However the difference was higher in the rural population.

Migration history is based on the information collected during the sentinel surveillance and is hopefully reliable. However representation characteristic of this group of ANC attendees to the migrant population cannot be ascertained.

Table 7: Migration status and HIV positivity in ANC, Tamilnadu Sentinel Surveillance, 2004

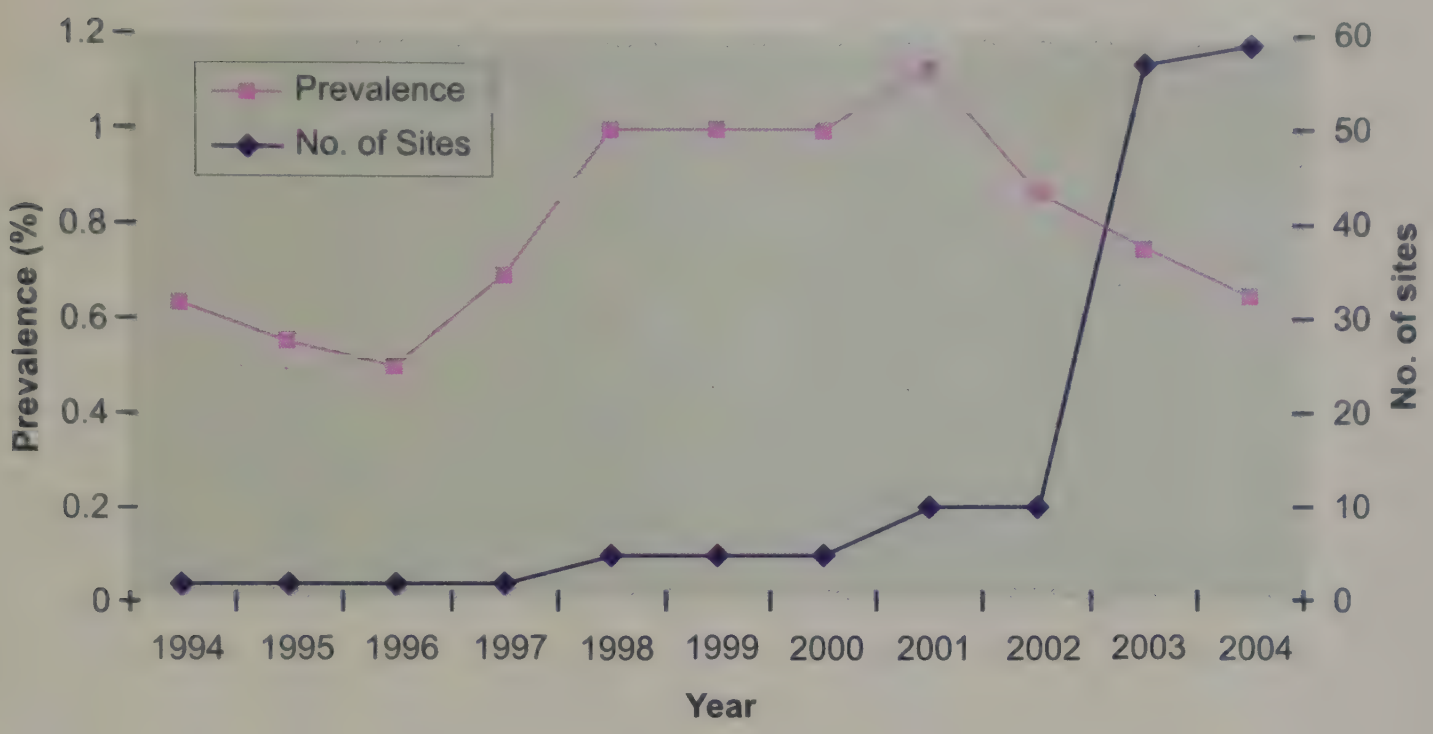
Migration	Dist. HQ Hospital (%)	FRUs (%)
Migrated	0.97	1.15
Non migrated	0.84	0.78

Table 8: Occupation distribution for spouses and HIV positivity in ANC, Tamilnadu Sentinel Surveillance, 2004

Occupation of spouse	Number Tested	Number Positive	% Positive
Agri/Unskilled worker	17948	135	0.75
Business	1600	20	1.25
Hotel Staff	651	11	1.69
Indust./Factory workers	2910	12	0.41
Service	1132	8	0.71
Student	17	0	0.00
Truck/Auto/Taxi Driver	2610	37	1.42
Unemployed	291	0	0.00
Total	27159	223	0.82

Table 8 provides data on HIV positivity status of ANC mothers according to the occupation of their spouses. Positivity rates are higher for spouses of hotel staff, truckers and businessmen. However the other categories of occupations do not exhibit absence or very low risks for HIV in their spouses.

Fig. 3 Yearwise of HIV infection (median %) among Antenatal women - Crude data, Sentinel Surveillance, Tamilnadu, 2004



Number of sentinel sites for ANC mothers in Tamilnadu went up from 2 in 1994 to 69 in 2004

Number of sentinel sites for ANC mothers in Tamilnadu went up from 2 in 1994 to 69 in 2004. Till the year 2000, there were only 5 sites. For 2001 and 2002 there were 10 and 11 each and then the number increased to 64 and 69 for 2003 and 2004. Initial focus, as per the sentinel approach, was on high risk areas. This focus changed to covering all the districts and general populations, with eventual chances of "dilution" of prevalence. Thus Fig. 3 gives only the crude picture from 1994 to 2004. Prevalence figures for 2003 and 2004 are lower compared to the previous years. However the decline is not precipitous. HIV sero-positivity is seen in every district, generally on the lower side but with not very great differences with each other, as also can be seen from table 3.

To understand the trend, one needs to consider the common sites followed over at least 3 years. We have made this effort as can be seen in Fig. 4 (a, b and c). It is possible that there were some operational changes in some years, such as in 2001. Generally however the approach appears to be similar over the years. These figures indicate a downward trend, or at least a steadying effect over the years 2001 to 2004. The epidemic does not seem to progress at an alarming rate and the HIV infection prevalence rates are lowering. All the same, the infection has invaded all the spheres of the society, urban-rural, various categories of educational status and different occupational levels.

Trends of HIV in common sentinel surveillance centers

Fig 4 (a) Trend of HIV +ves among ANCs in 4 years from 10 common centres: ANC Tamilnadu Sentinel Surveillance, 2004

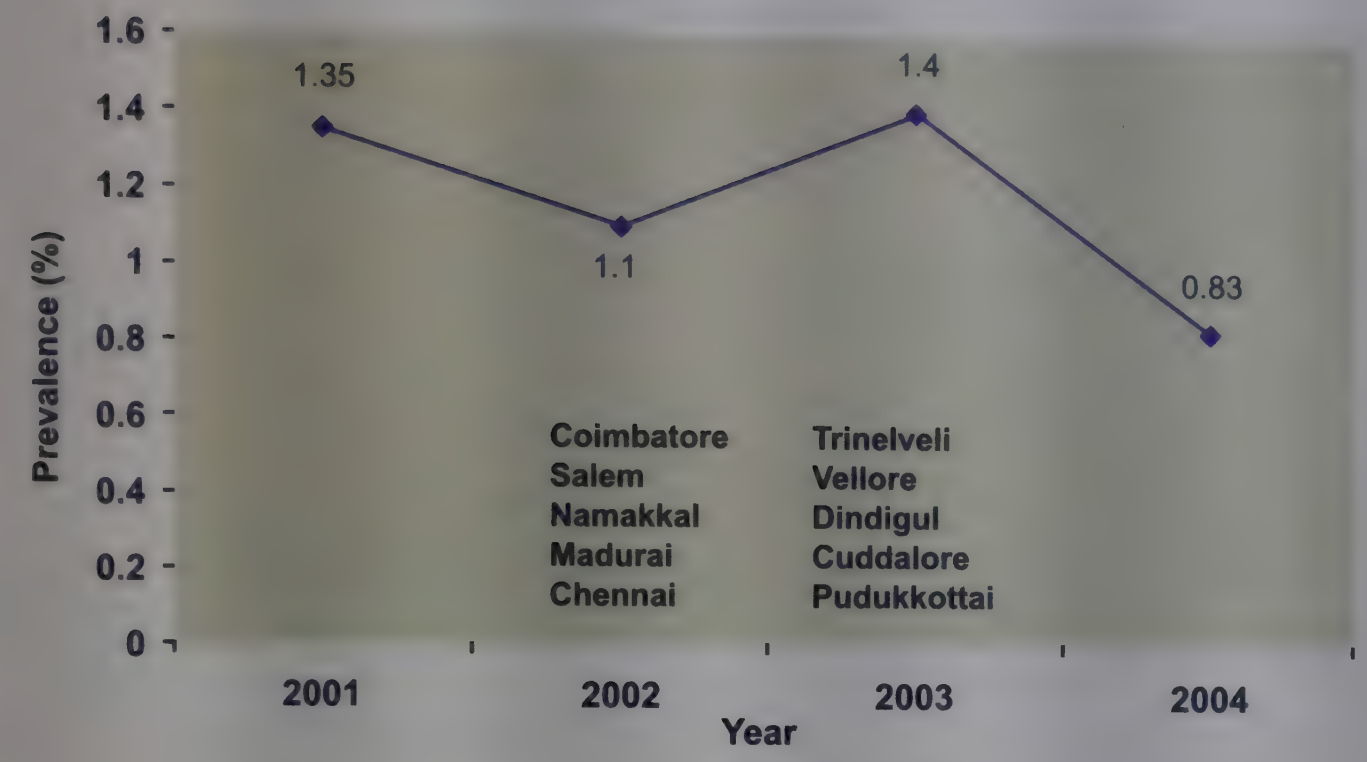


Fig. 4 (b) Trend of HIV +ves among ANCs in 6 years from 6 common centres: ANC Tamilnadu Sentinel Surveillance, 2004

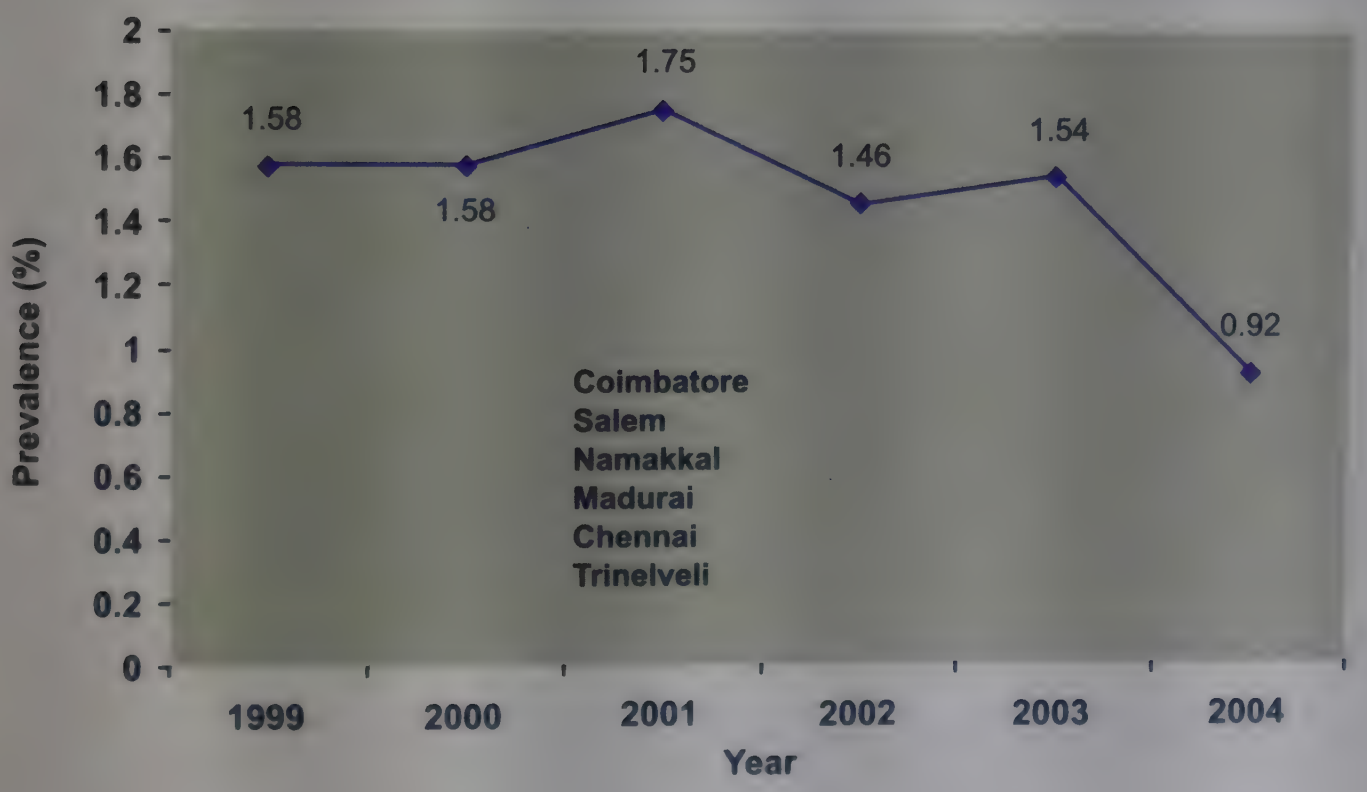
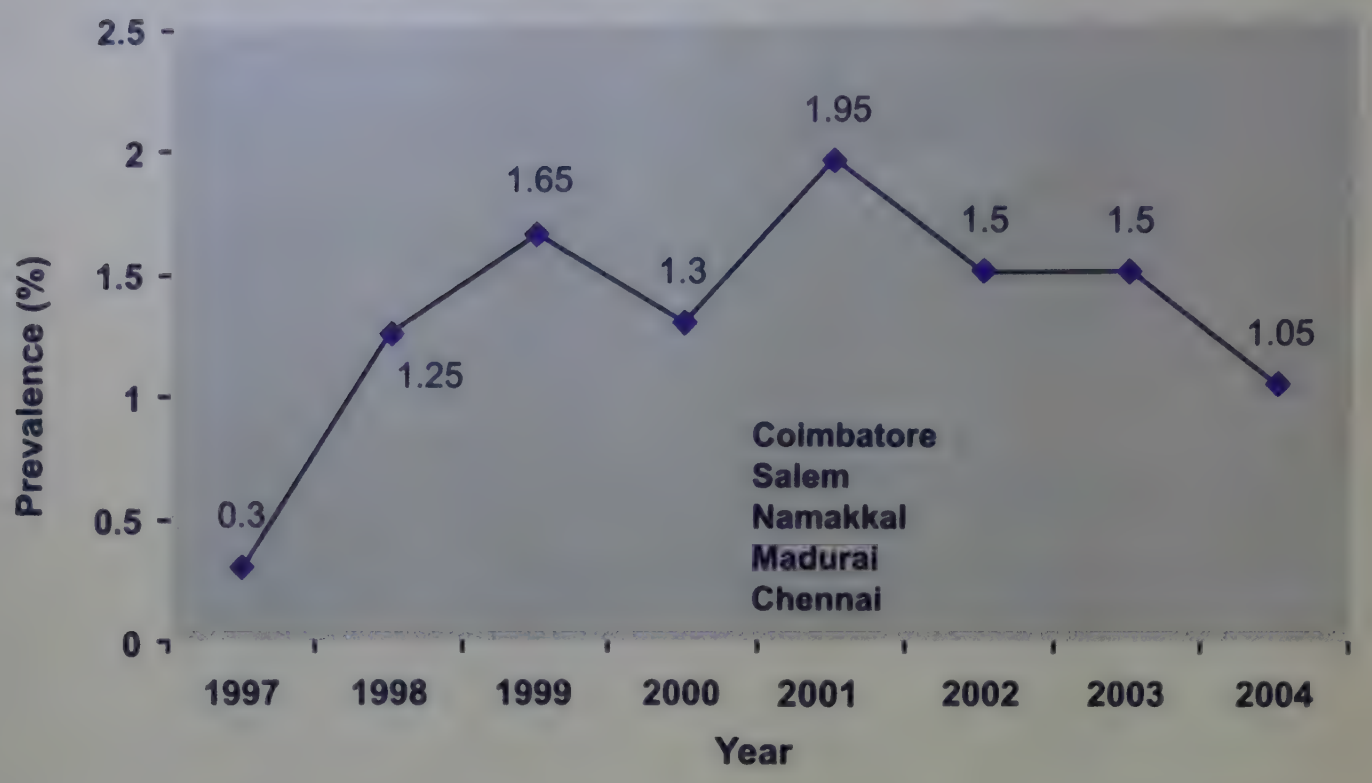
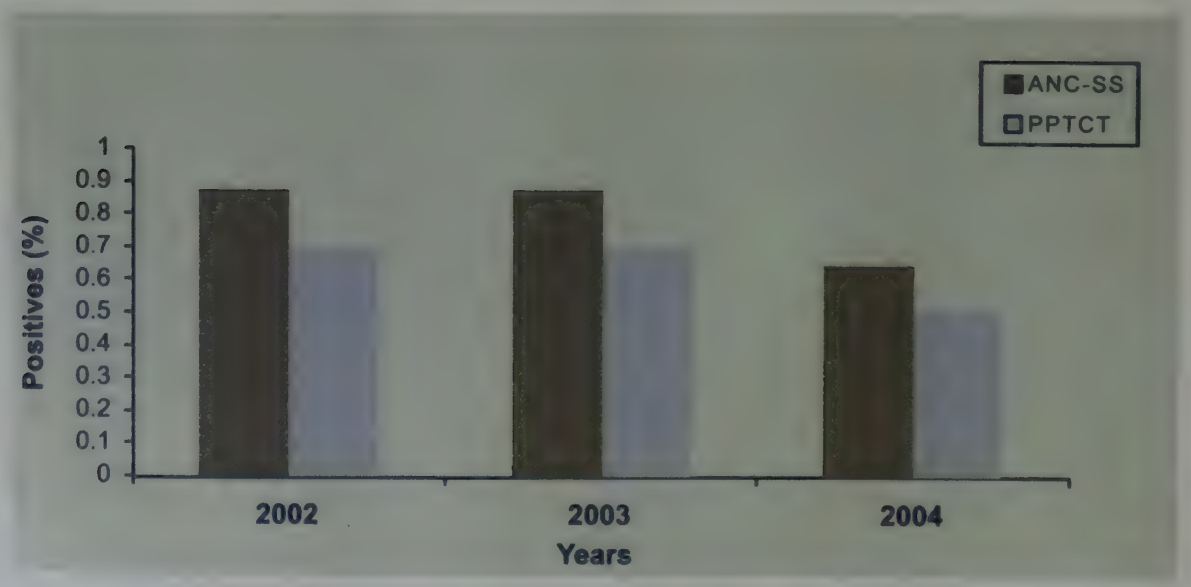


Fig. 4 (c) Trend of HIV +ves among ANCs in 7 years from 5 common centers: ANC Tamil Nadu Sentinel Surveillance, 2004



We have access to "Prevention of Parent to Child Transmission" (PPTCT) programme data for the last 3 years. This information is more representative and is based on larger samples. As can been seen from Fig. 4, the trend for both ANC sentinel surveillance sites and PPTCT data follows similar pattern. This finding adds value to the observation of downward trend (or at least stabilization) of HIV prevalence in Tamilnadu State.

Fig. 5 HIV positivity from ANC sentinel surveillance and PPTCT data, Tamilnadu Sentinel Surveillance, 2004



Geographical distribution of HIV prevalence

The data obtained for the sentinel sites were fed in to GIS software and extrapolated by using Krigging method. This showed the hot zones for HIV, concentrating mainly in the Central Tamilnadu region (Fig 6).

Fig. 6 HIV infection prevalence among ANC mothers based on Krigging:
Tamilnadu Sentinel Surveillance, 2004

HIV infection prevalence distribution is still patchy, though all parts of the state are affected.

Krigging method

The word "krigging" is synonymous with "optimal prediction". It is a method of interpolation which predicts unknown values from data observed at known locations. This method uses variogram to express the spatial variation, and it minimizes the error of predicted values which are estimated by spatial distribution of the predicted values. By using this krigging method, the geographical distribution of HIV spread among various sentinel sites have been identified and reproduced here.

ANC (15-24 years)

The 15-24 years age group represents fresh infections in the general community. This group is particularly important since the prevalence data is close to incidence for HIV infections. Five sites were selected for monitoring trends of HIV infection among the younger population aged 15-24 years age group. From each site 400 samples were collected. Out of 2000 mothers, 0.65% were positive for HIV (Table 9). This rate is similar to the median prevalence reported for the state in the age group 15 - 49 yrs age. Even though the information is based on data from only 5 centres, it shows continuing fresh transmission of HIV.

Table 9: HIV positivity in 15 - 24 yr age group in 5 sentinel sites, Tamilnadu Sentinel Surveillance, 2004

Age & sex distribution	Total Tested	Positive	Percentage
15-20	268	1	0.37
20-24	1732	12	0.69

ANC (Private hospitals)

In the year 2004, five private hospitals were included as sentinel sites for ANC. A total of 2000 samples were collected, out of them only 3 individuals were positive (0.15%) for HIV. Since the sample size is small, its interpretation also needs to be done with caution.

Table 10: HIV positives in private hospitals, Tamilnadu Sentinel Surveillance, 2004

Age & sex distribution	Total Tested	Positive	Percentage
Less than 20 yrs	98	0	0.00
20-29	1513	2	0.13
30-44	387	1	0.26
45 and above	2	0	0.00
Total	**2000**	**3**	**0.15**

The findings indicate that the HIV risk for ANC mothers in public and private sector facilities is different ($p<0.001$). Private sector's contribution to provision of health services is substantial. If HIV positivity in mothers receiving care in private hospitals is low, overall HIV burden in the State would also be low. This factor needs to be considered, while estimating HIV prevalence. This factor will have to be taken into account, while considering trends, estimates and ultimately the health care facility needs for the HIV infected in the State.

STD PATIENTS

In the year 2004 sentinel surveillance was conducted in 11 sites for HIV among STD patients. A total of 2750 samples were collected from STD patients out of whom 332 were positive for HIV. The median prevalence for HIV Infection among STD patients in the sentinel sites was 8.4%.

Age distribution:

Table 11: Age and sex specific HIV sero-positivity: STD Tamilnadu SentinelSurveillance, 2004

Age Group	Sex						Total		
	Male			Female					
	Nos. Tested	Nos. Positive	% Positive	Nos. Tested	Nos. Positive	% Positive	Nos. Tested	Nos. Positive	% Positive
<20	42	2	4.76	45	4	8.89	87	6	6.90
20-29	553	40	7.23	524	73	13.93	1077	113	10.49
30-44	700	102	14.57	515	76	14.76	1215	178	14.65
>44	262	24	9.16	109	11	10.09	371	35	9.43
Total	1557	168	10.79	1193	164	13.75	2750	332	12.07

In general the sero-positivity among the age group 30-44 was high compared with the other age groups, and is followed by positivity in 20-29 years age group. The positivity rate among the females in less than 30 years age was considerably high compared with the males.

Place of Residence

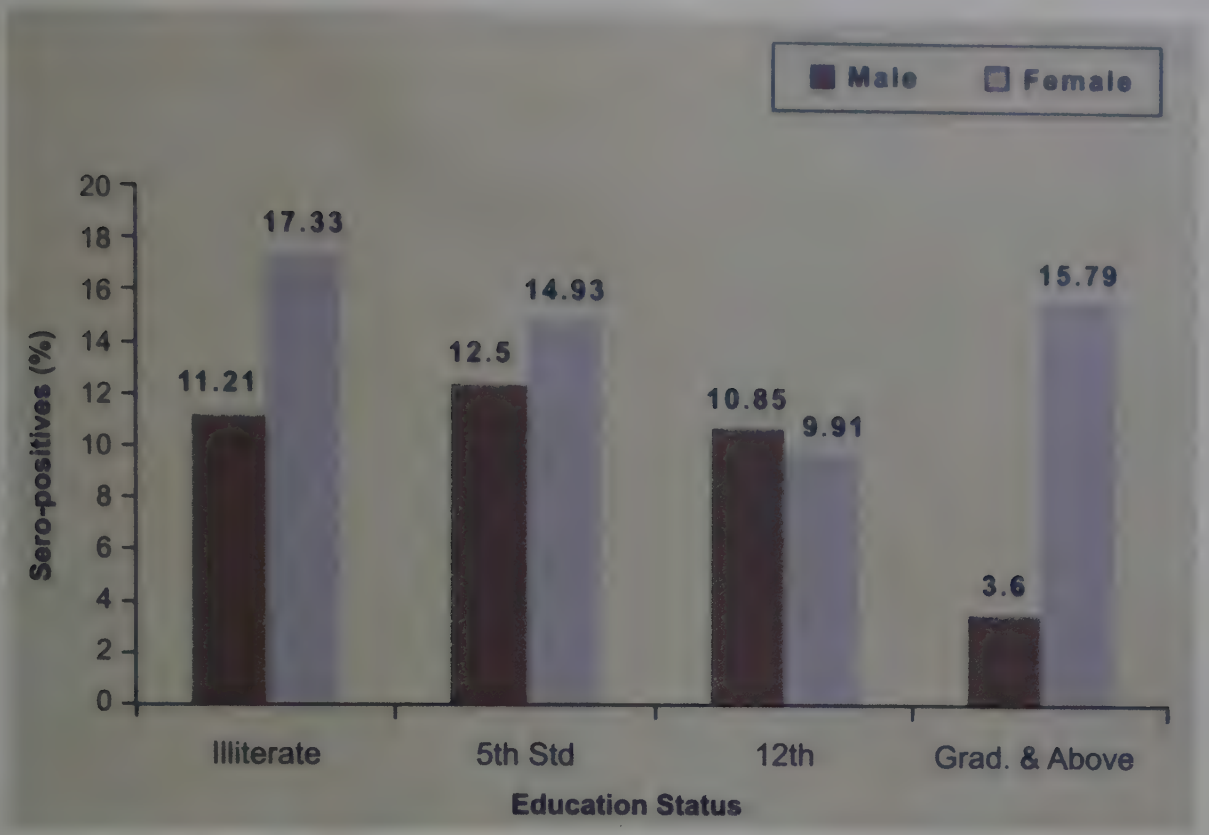
Table 12: HIV sero-positivity(%) in STD Group, Tamilnadu Sentinel Surveillance, 2002, 2003 and 2004

	2002	2003	2004
Urban	13.29	12.1	10.82
Rural	13.98	13.74	12.88

People residing in rural areas (12.88) had higher positivity compared with urban population (10.82) for the year 2004. The HIV infection is high among women in rural as well as urban population. The pattern was similar for 2002 and 2003 as well.

Educational status of STD Patients

Fig. 6 Educational status of STD Patients: Tamilnadu Sentinel Surveillance, 2004



As could be anticipated the infection rate was higher in lesser-educated population and as the educational status raised the HIV infection rate decreased. However HIV infection was high in graduate females. Even though efforts are made to consider subgroup data, number of observations is small and definitive conclusions for the subgroups cannot be drawn.

Occupation of STD patients

Table 13 - HIV positivity(%) according to occupation for STD, Tamilnadu Sentinel Surveillance, 2004

Occupation	Male	Spouses of female
Agri/Unskilled worker	11.20	17.36
Business	12.20	5.26
Hotel Staff	13.24	0.00
Housewife	—	12.25
Indust./Factory workers	8.60	7.35
Service	4.26	26.32
Student	2.70	0.00
Truck/Auto/Taxi Driver	16.83	25.00
Unemployed	0.00	5.71

Drivers had higher positivity for HIV compared with other groups. This was followed by hotel staff in male population. For females, the occupation of spouse was recorded. The data shows the spouses of drivers and service personnel had higher positivity rate than other population.

Clinical diagnosis

Clinical diagnosis

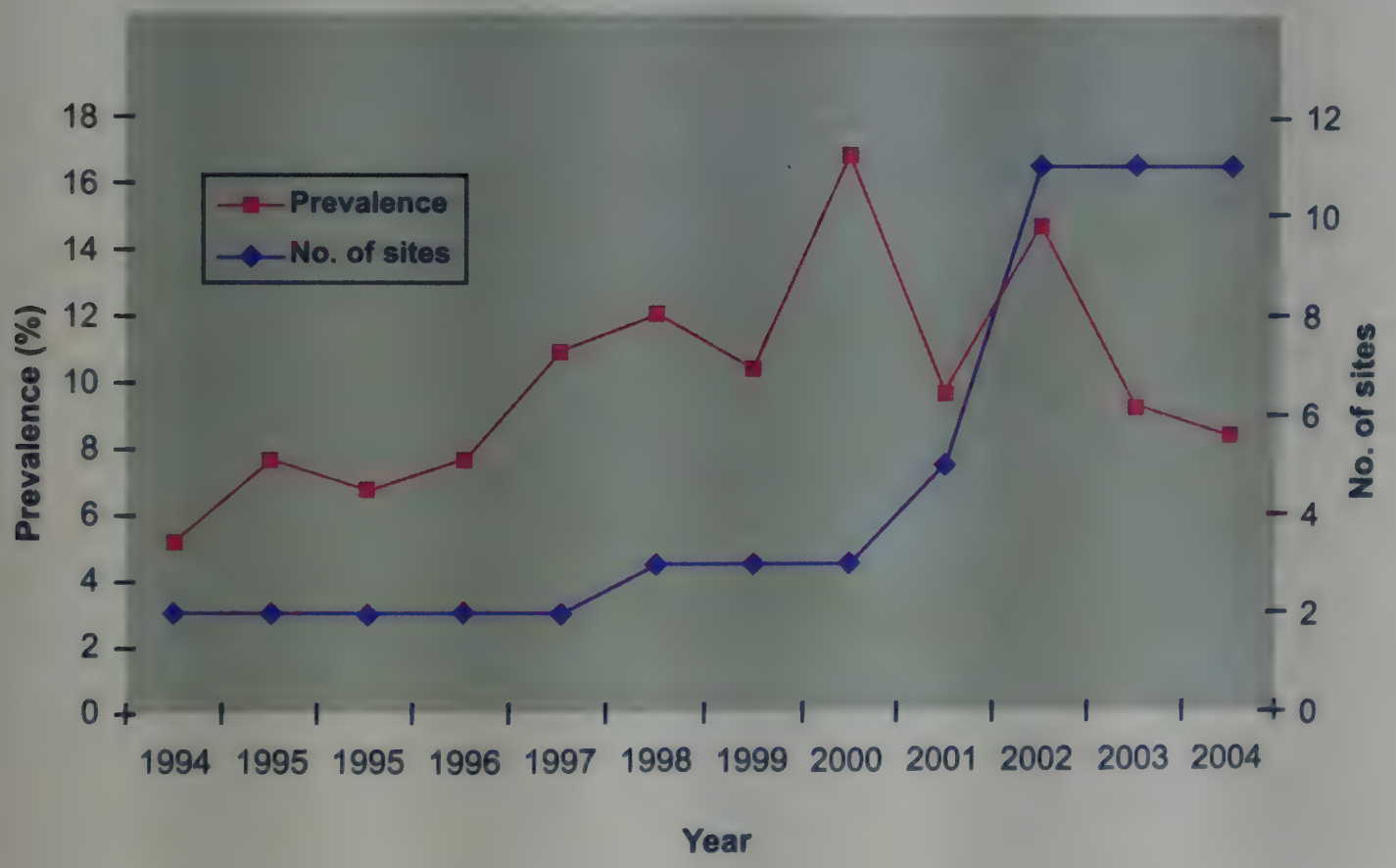
Table 14 - HIV sero-positivity(%) according to STD Clinical diagnosis, Tamilnadu Sentinel Surveillance, 2004

	Male	Female	Total
Genital Ulcers	9.87	14.87	10.80
Urethral Discharge	9.53	NA	9.53
Cervical Discharge	NA	13.62	13.62
Genital Ulcers & Discharge	17.24	14.04	14.69
Genital Wart	20.83	10.53	17.91

The analysis of clinical diagnosis showed that patients with definite clinical manifestations had higher HIV positivity and those with warts had the highest positivity for HIV.

Trend of infection

Fig. 7 Crude HIV infection (median %) among STD patients year wise (1994 2004), Tamilnadu Sentinel Surveillance, 2004



Median HIV infection prevalence for the state for the years 1994 to 2004 is given in Fig. 7. For the earlier period (1993 to 2001) there were only a few sites for STD Sentinel Surveillance. Only from 2002, there have been 11 sites each year.

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Trends in common centers

Fig 8 (a) Trend of HIV +ves among STDs in 3 years for 11 common sites
Tamilnadu Sentinel Surveillance, 2004

Fig 8 (b) Trend of HIV +ves among STDs in 4 years for 5 common sites
Tamilnadu Sentinel Surveillance, 2004

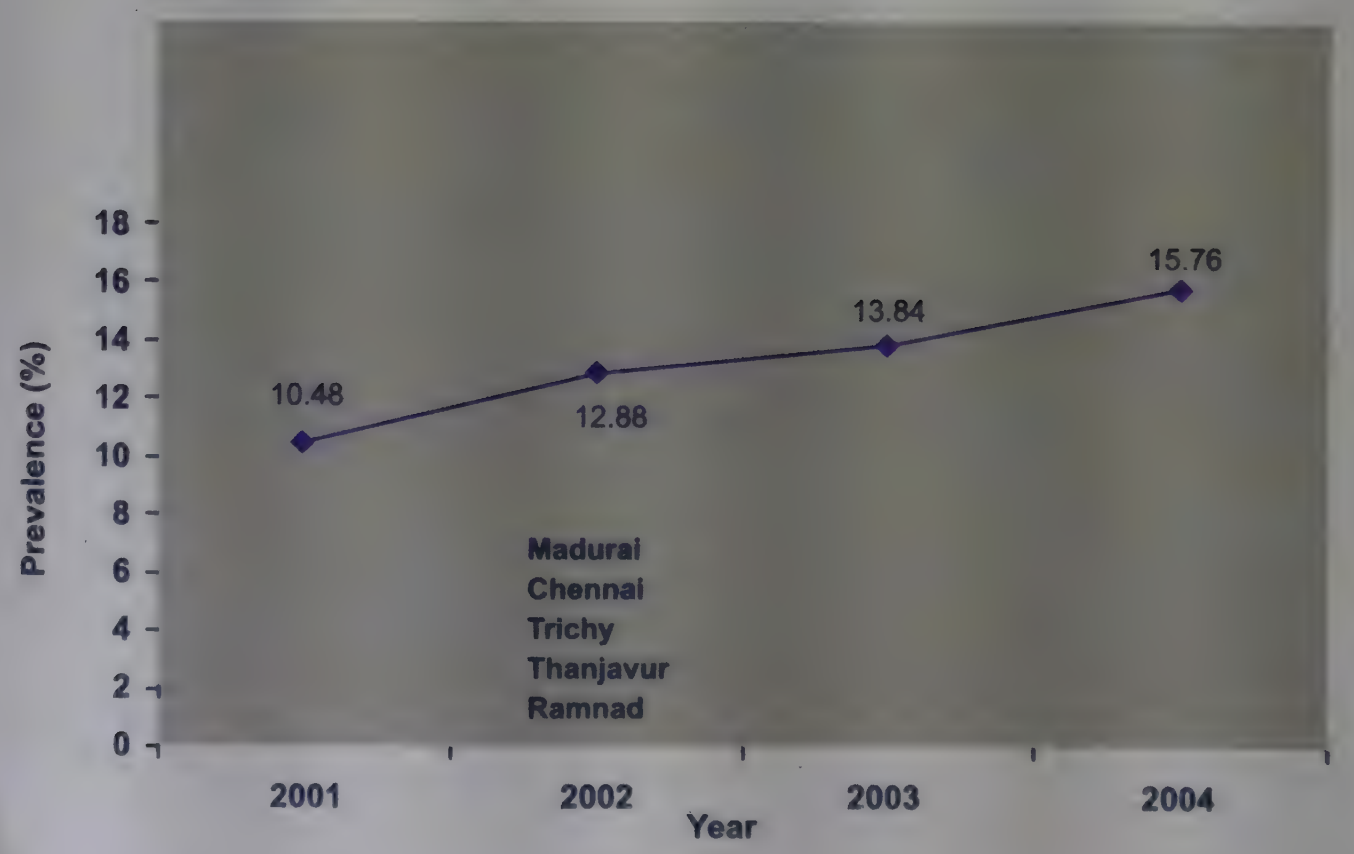


Fig 8 (c) Trend of HIV +ves among STDs in 7 years from 3 common sites n=750/year

Fig 8 (a), (b) and (c) provide information on HIV trends for common sites. Over the last 3 years, the pattern seems to be stable, prevalence around 12% to 13%, for 11common sites. As can be seen from Table 15, central region of the state continues to be the hot zone for HIV for the past few years (8 to 30% positivity in different districts). This is in line with the ANC surveillance data.

Geographical distribution

Geographical distribution

Table 15 - Districtwise HIV infection prevalence(%) in STD surveillance sites for the years 2002, 2003 & 2004, Tamilnadu Sentinel Surveillance, 2004

District Name	2002	2003	2004
Vellore	1.0	6	4
Ramnad	4.3	5.2	5.2
Kancheepuram	2.4	5.2	6
Chennai	8.8	7.2	8
Coimbatore	14.6	9.2	8.4
Salem	14.8	11.6	8.4
Karur	18.8	8.4	13.2
Tirunelveli	22.8	34	14
Thanjavur	11.2	14.4	14.8
Tiruchirappalli	15.2	21.6	20.4
Madurai	24.8	20.8	30.4

The data shows Madurai, Tiruchi and Thanjavur were consistently showing higher positivity rates compared with other sites.

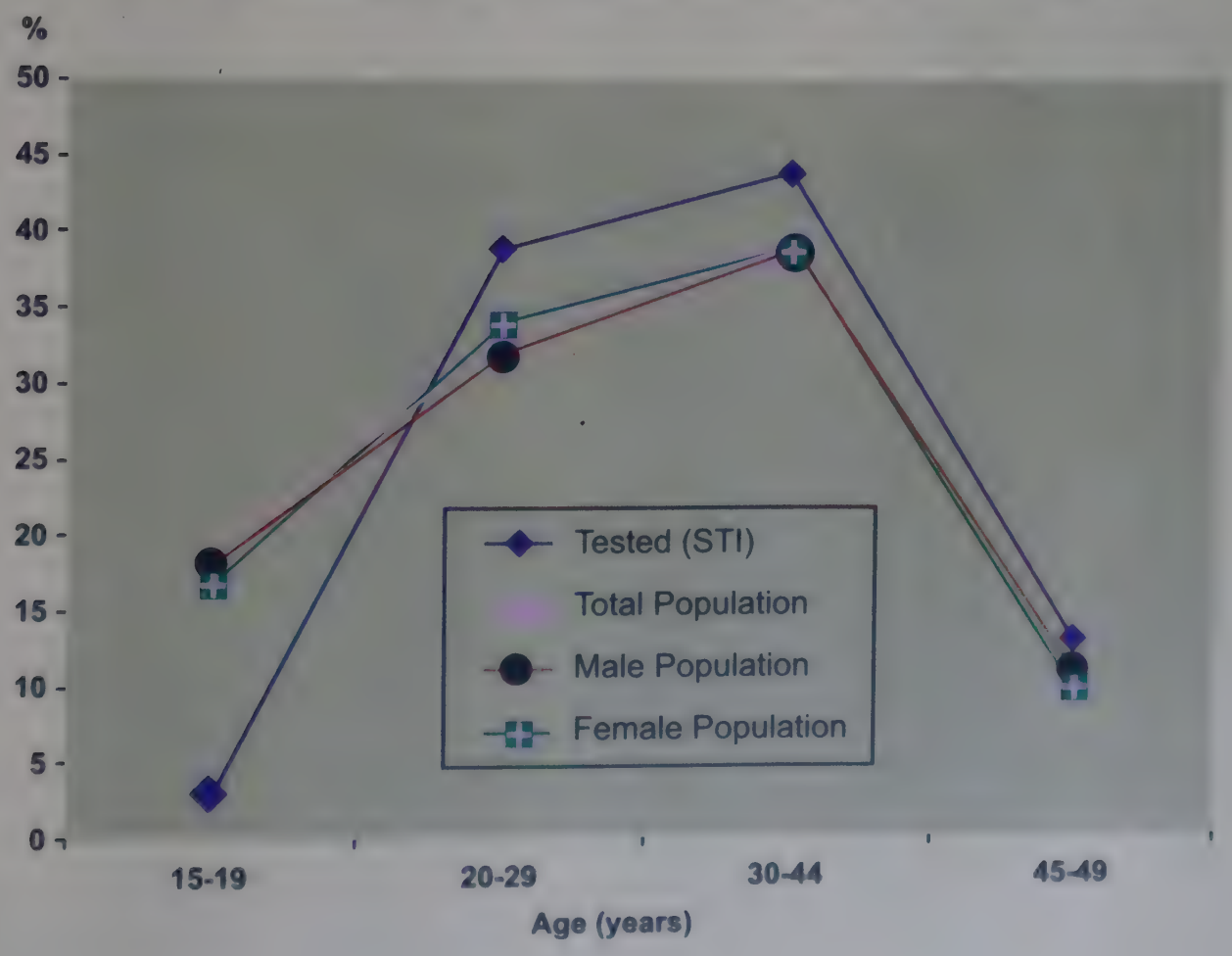
For STD sentinel surveillance, there are only 11 sites for the entire state (Table 15). Data from sentinel sites for STD is considered while working out HIV prevalence estimates. More than 50% of the estimated prevalence cases come from the STD affected people. It was therefore considered necessary to plot a krigging map based on these smaller number (11) of sites (Fig 9). A very gross picture that emerges shows the central region of the state as the worst affected part.

Fig. 9 HIV Infection prevalence among STD patients based on Krigging method: Tamilnadu Sentinel Surveillance, 2004

In the STD patients attending the public hospitals, HIV prevalence is around 12%. However, there is no large enough data available from the STI patients in the general population. In the absence of such data, information from patients attending STI clinics is used to estimate HIV prevalence in the STI patients in the community. This group presently contributes about 52% to 57% of the total estimated HIV infections in the state. Is this projection realistic? In the absence of any other data, we have looked into the available APAC data at community level for the year 2003- 04. APAC estimated the prevalence for microbiologically confirmed STI as 10.6% based on the examination of about 1,300 individuals from 6 districts. Only one individual in about 200 bacteriologically confirmed STD patients, was co-infected with HIV. APAC exercise was oriented towards STD estimation. However, only one co-infection with HIV and STD at community level, raises doubts about the assumption of 12% HIV positivity in 10% of STD patient population in the community. Such an assumption is likely to lead to gross over estimation of HIV burden in the state and the country as well.

Another complicating feature is with respect to the age composition of STD patients. It is not similar to the age distribution for general community in the age group 15 - 49 yrs (Fig 10). Hence applying the observed HIV positivity rate from the STD Sentinel surveillance to the general community for HIV prevalence estimation could be problematic.

Fig. 10 Age distribution of STD sentinel site attendees compared with 2004 population for Tamilnadu (Sentinel Surveillance, 2004)



OTHER GROUPS

Injecting drug users, men having sex with men, female commercial sex workers, truckers etc. constitute the bridging populations. They may also be exposed to other modes for HIV infection.

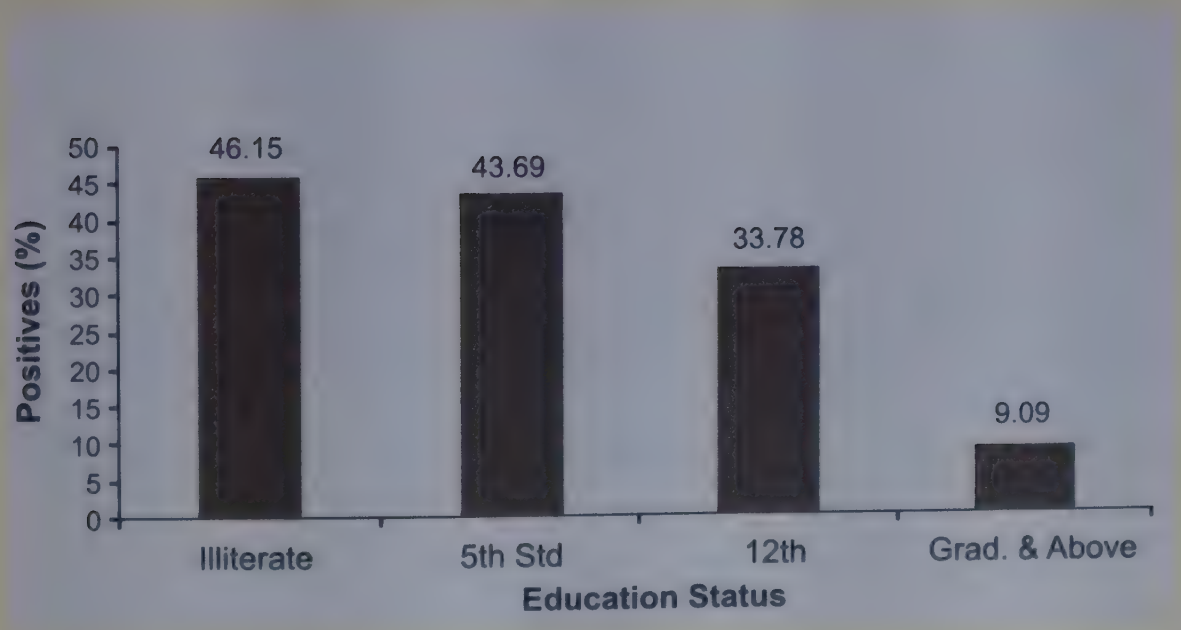
Injecting Drug Users

In this year, as in the past, only one site was selected for injecting drug users. A total of 253 samples were collected, out of which 101 were positive. Prevalence was 39.9%. There was only one female participant in the study. She was negative for HIV. Hence the data given here is primarily the data of male population. In this survey all the participants are from urban locale. Except two, all of them were non-migrant and out of the two migrants, one was positive for HIV.

Table 16: Age specific HIV positivity, Tamilnadu Sentinel Surveillance, 2004

Age group (Yrs)	Tested	Positive	Prevalence (%)t
20-29	65	18	27.69
30-44	171	78	45.61
>44	17	5	29.41
Total	253	101	39.92

Fig 11 HIV positivity according to educational status for IDUs, Tamilnadu Sentinel Surveillance, 2004



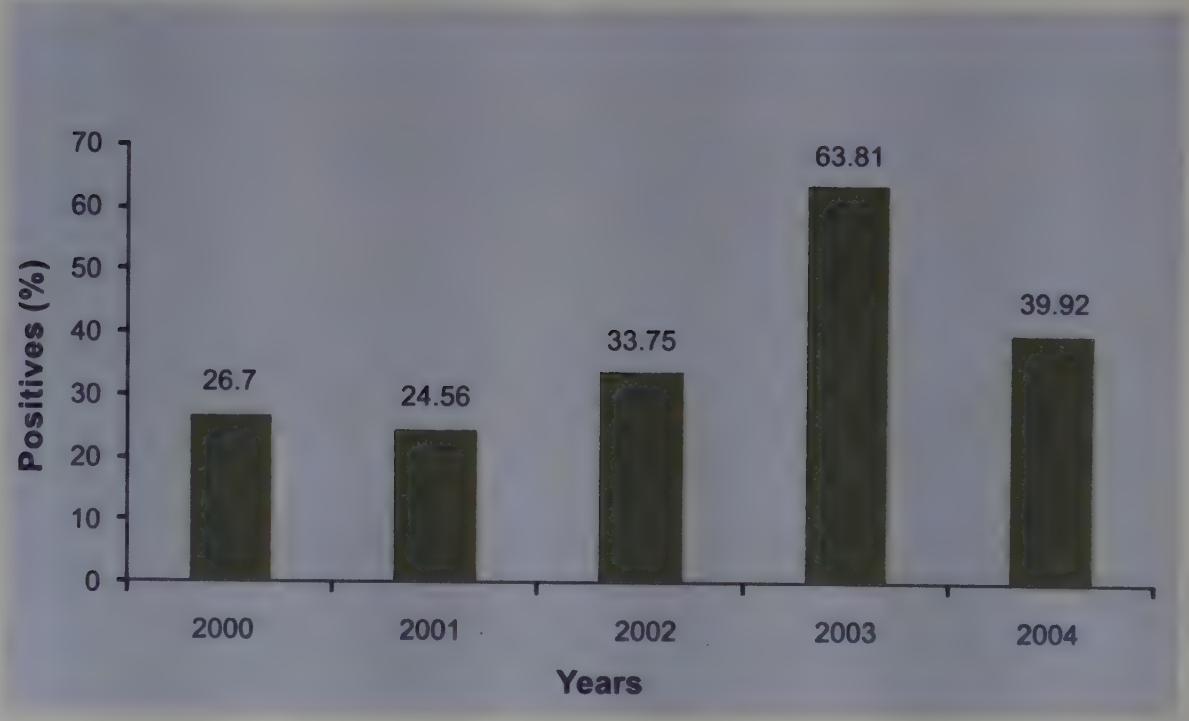
As in the other age groups the HIV infection was high among illiterate population, 46.15 percent of the illiterate intravenous drug users having HIV infection. As the educational status increased the HIV infection among intravenous drug users decreased.

Occupational status

Table 17: HIV positivity(%) according to occupations, IDUs, Tamilnadu Sentinel Surveillance, 2004

Occupation	Tested	Positive	Positive
Agri/Unskilled worker	111	50	45.05
Business	10	5	50.00
Hotel Staff	3	2	66.67
Indust./Factory workers	35	13	37.14
Service	11	3	27.27
Truck/Auto/Taxi Driver	50	17	34.00
Unemployed	32	11	34.38
Total	253	101	39.92

Fig 12 CRUDE TREND OF HIV AMONG IDUs, TAMILNADU SENTINEL SURVEILLANCE, 2004



The pattern of the HIV infection among the injecting drug users shows a slow rising trend.The spurt in the year 2003 was due to change of site for sentinel surveillance. Observations world-over, including Manipur, have shown a fast rise in HIV sero-positivity over much shorter periods. Even the transmission in the spouses of HIV sero-positive IDUs is much higher in Manipur than what we observed (16.7%, Chennai IDUs) recently in one of our studies.

Men Having Sex With Men

This year sentinel surveillance had two sites for MSM, one was at Chennai and the other was at Villupuram. A total of 500 samples were collected out of which 34 were positive for HIV. Prevalence of HIV among MSM was 6.8%

Age distribution

Table 18: Age specific HIV positivity in MSM, Tamilnadu Sentinel Surveillance, 2004

Age_Group	Tested	Positive	%
<20	32	1	3.13
20-29	304	22	7.24
30-44	152	10	6.58
>44	12	1	8.33
Total	500	34	6.80

The data shows that there were considerable numbers of people who engage in sex before the age of 20. Majority of the MSM were in the age group of 20-29 years age group. The positivity was also high in the age group.

Place of residence and migration

In the rural population HIV positivity was 6.06% and in the urban population it was 7.16%. The proportion of HIV positive MSM was high in non-migrant MSM 7.43% and in the migrant MSM it was 5.65%

Literacy status

Table 19 provides information on HIV positivity according to educational status in the MSM group.

Table 19: HIV positivity according to educational status, MSM, Tamilnadu Sentinel Surveillance, 2004

Education	Tested	Positive	%
Illiterate	56	6	10.71
5th std	136	15	11.03
12th	247	12	4.86
Grad. & Above	61	1	1.64
Total	500	34	6.80

Occupation

Table 20: HIV positivity according to occupation, MSM, Tamilnadu Sentine Surveillance, 2004

Occupation	Tested	Positive	%
Agri/Unskilled worker	83	9	10.84
Business	56	3	5.36
Hotel Staff	76	5	6.58
Indust./Factory workers	80	3	3.75
Service	12	2	16.67
Student	44	3	6.82
Truck/Auto/Taxi Driver	42	1	2.38
Unemployed	107	8	7.48
Total	500	34	6.80

The data from Table 20 shows that the MSM working as service personnel had a higher positivity rate followed by unskilled laborers.

Fig 13 Trend of HIV among MSM population, Tamilnadu Sentinel Surveillance, 2004

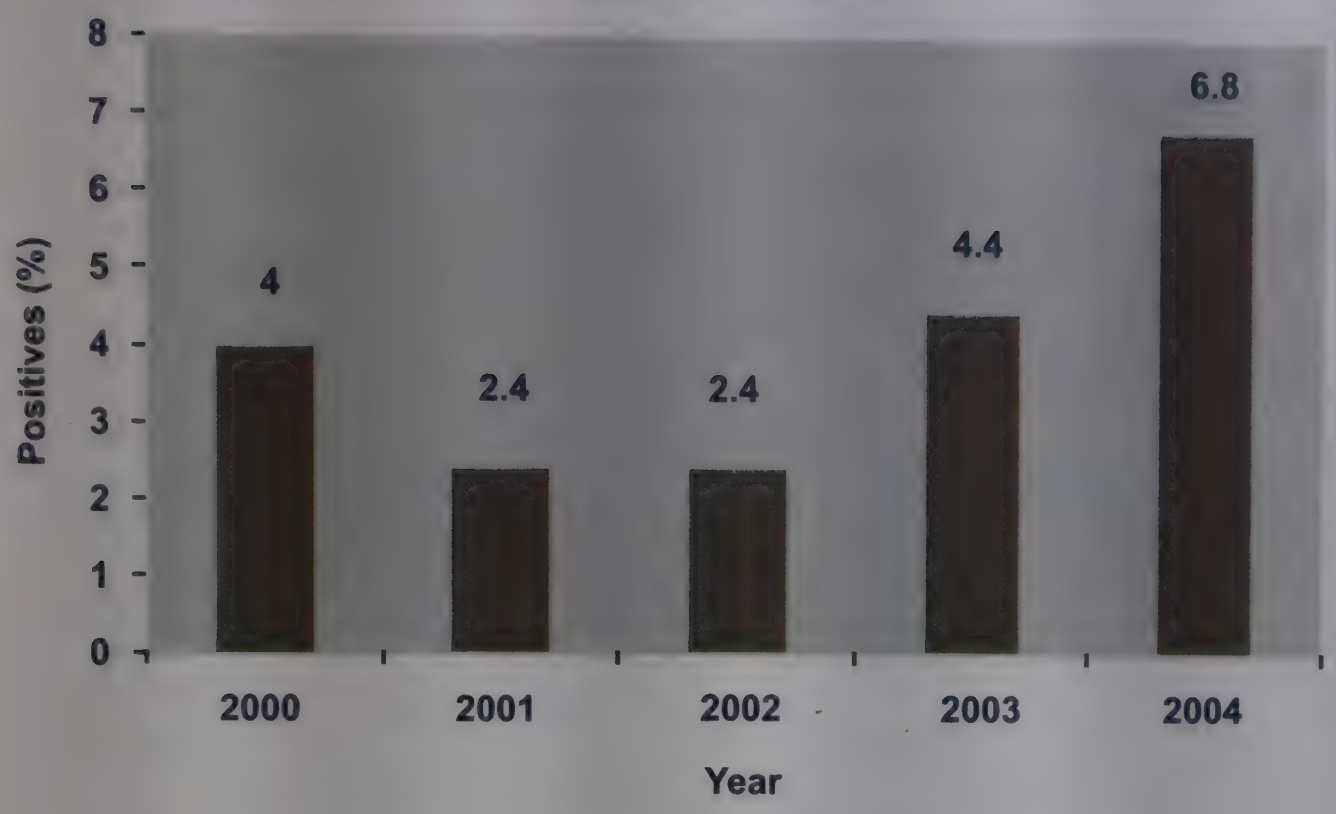


Fig 13 shows a rising trend for HIV positivity in the MSM group.

Female Commercial Sex Workers

The trend of HIV infection among female commercial workers is being tracked since 2003. There was one site assigned at Chennai urban for commercial sex workers. Out of 250 samples collected for the year 2004, only 10 were positive. The prevalence rate was 4%. For the year 2003, prevalence was 8.8%. In comparison to several other regions, sero-positivity in this bridge population as well is also much lower.

Age distribution

Table 21: Age specific HIV prevalence in FSW, Tamilnadu Sentinel Surveillance, 2004

Age group	Tested	Positive	Percent
<20	5	1	20.00
20-29	69	1	1.45
30-44	174	8	4.60
>44	2	0	0.00

Most of the female attendees were between the age group of 30-44 year age group and the proportion of the positive people was also high in that age group. Even though there were only 5 individuals in the age group of less than 20 years. 1 of them was positive.

Education distribution

Table 22: HIV positivity according to educational status, Tamilnadu Sentinel Surveillance, 2004

Education	Tested	Positive	%
Illiterate	98	6	6.12
5th std	72	2	2.78
12th	79	2	2.53
Grad. & Above	1	0	0.00
Total	250	10	4.00

The data shows the illiterate commercial sex workers had higher positivity rate than educated ones. As the educational status increased the prevalence was also decreased.

The proportion of migrated women was higher than the non-migrated women. But the positivity rate was high in non-migrated women.

Female commercial sex workers constitute an important link in HIV transmission. There are no red light areas and brothels in the state. Sex work is a clandestine activity and hence it is not easy to track this group in the community. Like the IDUs and MSMs, FSWs are essentially tracked with the help of NGOs for the sentinel surveillance.

Tuberculosis

Association of HIV and tuberculosis is a well-recognized relationship. After a long gap the surveillance of HIV among tuberculosis patients was restarted in the year 2004. There was one site selected at Thiruvannamalai. A total of 174 samples were collected, out of whom 12 were positive for HIV. The prevalence of HIV among Tuberculosis patients was 6.9%

Age distribution

Table 23: Age specific HIV prevalence in Tuberculosis patients, Tamilnadu Sentinel Surveillance, 2004

Age group	Male (%)	Female (%)	Total (%)
<20	0.00	8.33	4.76
20-29	14.29	9.09	12.00
30-44	3.77	4.35	3.95
>44	9.52	0.00	7.41
Total	7.21	6.35	6.90

The age group between 20-29 had the highest positivity compared to the other age groups for both males and females. This was followed in the age group more than 44 years.

ESTIMATION AND PROJECTION

Estimation

India has the second highest number of HIV/AIDS infections in the world. Within India Tamilnadu alone is reporting nearly half of the cases of AIDS. Information on magnitude of the HIV epidemic in Tamilnadu is required for the control programme for both treatment and preventative measures. The estimate of HIV/AIDS is an important measure to serve as the basis for resource mobilization, programme planning and focusing intervention efforts to control the spread of infections. In this context, attempts have been made to estimate the total number of HIV infections by using NACO procedures adopted at national level for estimation. Following these procedures, an estimate of 3.3 to 4.3 lakh infections in the state in the age group of 15-49 years can be arrived at. Table 24 gives the actual plan and figures for this estimation.

We need to consider the process and steps of this estimation, and these steps are broadly given below.

1. Population at risk in the age group 15-49 years for the year is estimated based on the decennial census.
2. Applying the observed rate of HIV prevalence in the ANCs from the sentinel surveillance, number of HIV infected in the age group 15-49 years are worked out.
3. Assuming the rate of 6% (or 10%) prevalence for STDs in the age group 15-49 years, the number of STD patients in that age group are worked out.
4. Using HIV estimated prevalence rate for STDs from sentinel surveillance, numbers of HIV infected from this populations are calculated.
5. Similar calculations are made for different bridge populations to

calculate HIV infected individuals from those groups.

6. All those HIV infected numbers are added to reach the final HIV infected individuals in the age group 15-49 years for the given geographical area such as a country or a state

There are several limitations with respect to this estimation as brought out by us in this report at several places earlier. Sero-positivity in the ANC group varies according to the sector for service. Public sector roughly contributes 60% of services to the ANCs in Tamilnadu and the remaining 40% are from private sector. With respect to STD group, not many approach health services but resort to self-management by seeking treatment across the counter. Only a small fraction of this group would seek services from the public sector. If we adopt these pointers and make necessary corrections, the estimates would drop to 1.4 to 1.6 lakhs. Perhaps the true prevalence will be between 1.6 to 3.3 lakhs and close to 1.6 lakhs.

There is an urgent need to validate the assumptions made for estimating the HIV infections. A community-based survey, though difficult, is urgently needed. Data from NFHS III may provide the information to bridge the gap. Some other studies are being planned to estimate HIV infection prevalence by conducting random sample surveys at general population level. Available information with respect to AIDS morbidity and mortality is sketchy and not reliable.

Table 24: Estimation of HIV infection in Tamil Nadu for the year 2004 (Earlier Procedure)

	Mean	Median
Urban male (15-49)	8885869	8885869
Urban female (15-49)	8892477	8892477
Rural male (15-49)	9307278	9307278
Rural female (15-49)	9472597	9472597
HIV prevalence among STD	12.07	8.4
HIV prevalence among ANC	0.75	0.65
Urban male (15-49) STD	533152	533152
Urban male (15-49) HIV +ve among STD	64351	44785
Urban male (15-49) NON-STD	8352717	8352717
Urban male (15-49) HIV +ve among NON-STD	75174	65151
Urban male (15-49) HIV +ve (Total)	**139525**	**109936**
Urban female (15-49) STD	533549	533549
Urban female (15-49) HIV +ve among STD	53451	37199
Urban female (15-49) NON-STD	8358928	8358928
Urban female (15-49) HIV +ve among NON-STD	62692	54333
Urban female (15-49) HIV +ve (Total)	**116143**	**91532**
Rural male (15-49) STD	586359	586359
Rural male (15-49) HIV +ve among STD	70774	49254
Rural male (15-49) NON-STD	8720919	8720919
Rural male (15-49) HIV +ve among NON-STD	9811	8503
Rural male (15-49) HIV +ve (Total)	**80585**	**57757**
Rural female (15-49) STD	596774	596774
Rural female (15-49) HIV +ve among STD	59785	41607
Rural female (15-49) NON-STD	8875823	8875823
Rural female (15-49) HIV +ve among NON-STD	27959	24231
Rural female (15-49) HIV +ve (Total)	**87744**	**65838**
No. of IDUs	7539	7539
HIV among IDUs (%)	39.92	39.92
No. of HIV +ve among IDUs	**3010**	**3010**
No. of CSWs	81064	81064
HIV among CSWs (%)	4	4
No. of HIV +ve among CSWs	**3243**	**3243**
No. of MSMs	30000	30000
HIV among MSMs (%)	6.8	6.8
No. of HIV +ve among MSMs	**2040**	**2040**
Total number estimated HIV positives	**432290**	**333356**

Table 25: Estimation of HIV infection in Tamil Nadu for the year 2004-Revised

	Mean		Median
Urban male (15-49)	8885869		8885869
Urban female (15-49)	8892477		8892477
Rural male (15-49)	9307278		9307278
Rural female (15-49)	9472597		9472597
	Govt.	**Others**	**Govt.**
HIV prevalence among STD	12.07	0.5	8.4
HIV prevalence among ANC	0.75	0.15	0.65
Urban male (15-49) STD	888587		888587
Urban male (15-49) HIV +ve among STD – Govt	5363		3732
Urban male (15-49) HIV +ve among STD – Private	4221		4221
Urban male (15-49) NON-STD	7997282		7997282
Urban male (15-49) HIV +ve among NON-STD – Govt	43185		37427
Urban male (15-49) HIV +ve among NON-STD – Private	5758		5758
Urban male (15-49) HIV +ve (Total)	**58527**		**51138**
Urban female (15-49) STD	889248		889248
Urban female (15-49) HIV +ve among STD – Govt	4454		3100
Urban female (15-49) HIV +ve among STD – Private	3506		3506
Urban female (15-49) NON-STD	8003229		8003229
Urban female (15-49) HIV +ve among NON-STD – Govt	36015		31213
Urban female (15-49) HIV +ve among NON-STD – Private	4802		4802
Urban female (15-49) HIV +ve (Total)	**48777**		**42621**
Rural male (15-49) STD	930728		930728
Rural male (15-49) HIV +ve among STD – Govt	5617		3909
Rural male (15-49) HIV +ve among STD – Private	4421		4421
Rural male (15-49) NON-STD	8376550		8376550
Rural male (15-49) HIV +ve among NON-STD – Govt	5654		4900
Rural male (15-49) HIV +ve among NON-STD – Private	754		754
Rural male (15-49) HIV +ve (Total)	**16446**		**13984**
Rural female (15-49) STD	947260		947260
Rural female (15-49) HIV +ve among STD – Govt	4745		3302
Rural female (15-49) HIV +ve among STD – Private	3735		3735
Rural female (15-49) NON-STD	8525337		8525337
Rural female (15-49) HIV +ve among NON-STD – Govt	16113		13965
Rural female (15-49) HIV +ve among NON-STD – Private	2148		2148
Rural female (15-49) HIV +ve (Total)	**26741**		**23150**
No. of IDUs	7539		7539
HIV among IDUs (%)	39.92		39.92
No. of HIV +ve among IDUs	**3010**		**3010**
No. of CSWs	81064		81064
HIV among CSWs (%)	4		4
No. of HIV +ve among CSWs	3243		3243
No. of MSMs	30000		30000
HIV among MSMs (%)	6.8		6.8
No. of HIV +ve among MSMs	**2040**		**2040**
Total number estimated HIV positives	**158784**		**139186**

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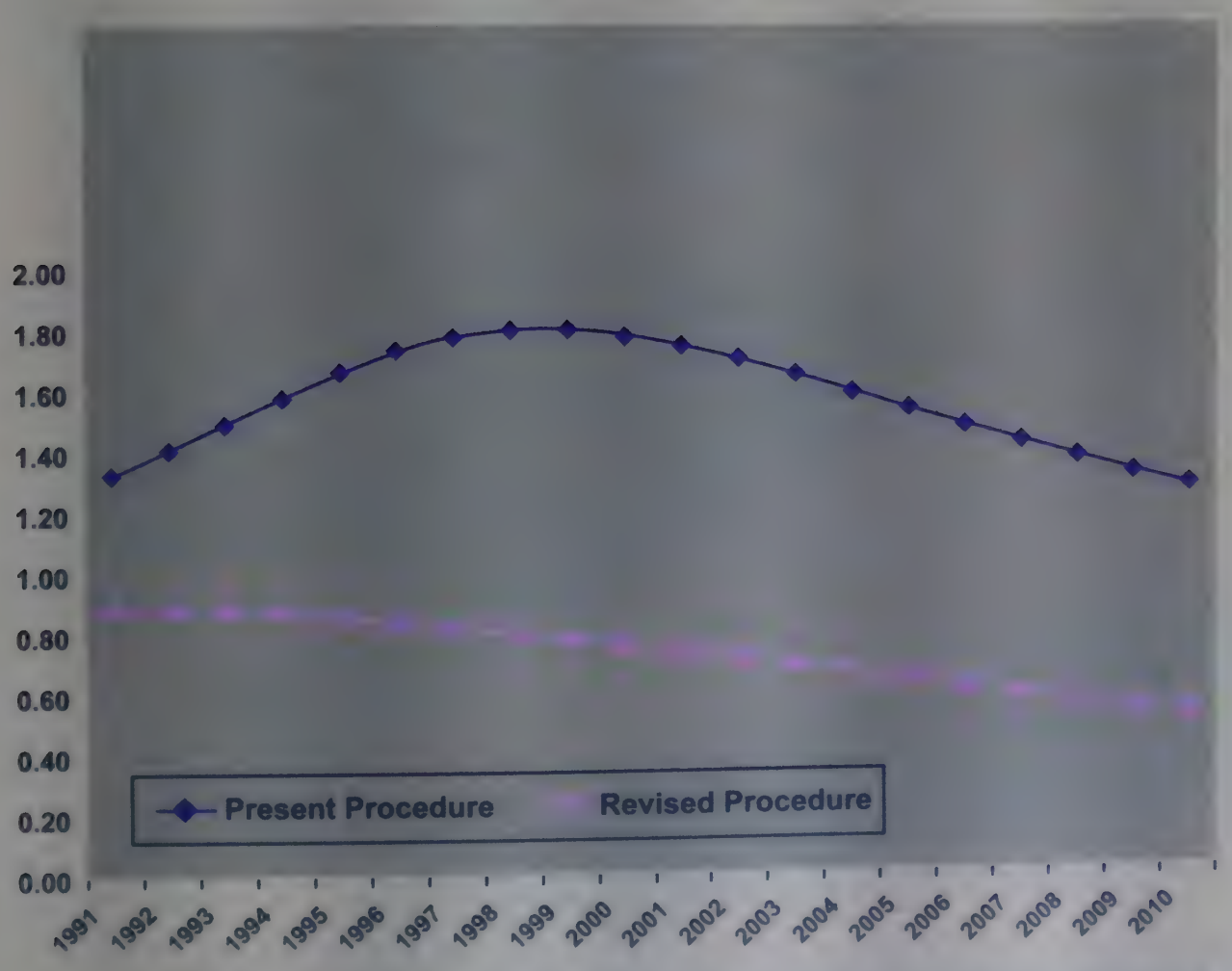
Projections

Epidemic Projection Packages (EPP) is widely used by many international and national organizations for advocacy & planning. Projections are used to understand the dynamics of the AIDS epidemic. This EPP program is a substitute to EpiModel, which is being used for estimation. This curve-fitting model has been developed by UNAIDS/WHO. This model attempts to fit mathematical curves to the observed prevalence trends. This is used to create a simple model of the epidemiological trends for any given region based on a set of mathematical equations. This program is a simple epidemiological model to find the best fitting curve that describes the evolution of adult HIV prevalence over time.

Fig 14 PROJECTION OF HIV IN TAMIL NADU: EPP Model, Tamilnadu Sentinel Surveillance, 2004



The fitted curve uses available sentinel surveillance data. The model predicts a downward trend as is being seen through the ANC sentinel surveillance and the PPTCT data as well.

LESSONS LEARNT

In 1993 sentinel surveillance for HIV was launched with the intention to locate and identify entry of HIV infection in different geographical areas, over a period of time. On account of lack of reliable data for HIV prevalence estimates and the practical difficulties anticipated for undertaking community based random surveys, data from sentinel surveillance is being used for estimation purposes. To achieve this goal, a large number of sentinel sites have been identified over a period of time; several assumptions are made while working with the sentinel surveillance data in an effort to reach reliable estimates.

Sentinel surveillance data is also used for the purpose of identifying the trends of HIV transmission. Crude projection methods, ignoring operational factors and expansion of sites, can lead to unrealistic conclusions.

The third important use of the sentinel surveillance data is for developing epidemiological models. These models will help in projecting HIV/AIDS burden and in turn could be the basis of resource mobilization for preventive, curative and rehabilitative interventions. The outputs and their applicability depend on the assumptions and the inputs for the model.

Even though, sentinel surveillance is not an evaluation exercise, the information generated provides an opportunity to assess effectiveness of AIDS control efforts.

Sentinel surveillance data for Tamilnadu state provided opportunities to examine several issues to increase its utility.

HIV epidemic in Tamilnadu is not a homogenous epidemic. It is patchy in distribution with possible different trigger times for different areas. Hence when estimations and projections are made from the aggregate data, they will have some artificiality. But efforts are made to reach the results as close to the reality as possible.

HIV transmission in Tamilnadu is mainly through heterosexual mode. AIDS is associated with strong stigma. Hence the data generation is usually through unlinked and anonymous ways. To get correct estimates for HIV prevalence in hidden population groups is a challenging task.

There are only are 11 STD sentinel sites. Considering the projected HIV/AIDS load of over 50% from the STD group, number of these centers should increase. More data should be generated and triangulation should be attempted.

Private sector contributes to more than 70% of medical care. There is hardly any data available from this sector. Without the data from the private sector, knowledge on HIV prevalence will be incomplete.

Even though sentinel surveillance centers have grown in number, their

representative character for the general population remains questionable.

Sentinel sites provide biased data with respect to age structure, HIV prevalence in the STD group, possibly socio-economic background and educational status, geographical distribution (urban/rural) and several other known and unknown factors. There is an urgent need to generate representative, unbiased community based information.

There was not much of a difference in the sero-positivity rate among population according to educational status in ANC population. But in the high risk population, lesser educated had higher positivity compared to the higher educated population.

This year sentinel surveillance showed higher positivity among spouses of hotel workers, industrial workers and business people.

Feminization of HIV epidemic is becoming clearer. Planning for control measures in these situations will need very careful, sustained, sensitive and integrated approaches oriented to empower the women folk.

Uneven distribution of HIV and its concentration in the central region of the state is obvious. The worst affected districts in the state are clearly identified. A micro-level planning to control the epidemic in these districts should be urgently considered.

Data from ANC sentinel sites is used to consider HIV transmission at the community level. There are indications of stabilization or even downward trend of the epidemic. Available data from PPTCT for the past 3 years supports this hypothesis. Comparatively lower levels of HIV prevalence in the bridge populations- IDUs, FSWs, and MSMs- in spite of the existence of the epidemic for the past almost 20 years, show HIV's slow spread. At the same time the epidemic has percolated into rural areas and the rural/urban differences have disappeared. HIV is present in all parts of the state. Thus the epidemic needs to be contained in all the regions, in both rural and urban areas, and in all sexually active age groups including the teen age group.

The overall burden of HIV seems to be lower than the projected. Even though there are limitations with the data, the estimated HIV infection prevalence of 3.3 to 4.3 lakhs, worked out on the basis of the present procedures for the state appears to be much larger. The actual figure could be some where between 1.6 to 3.3 lakhs, but closer to 1.6 lakhs.

Efforts to contain the HIV epidemic seem to be yielding results. There is a need to closely monitor the programme and generate more data in systematic manner. AIDS control efforts in the state should continue in a sustained and targeted mode.

Annexure 1
HIV SURVEILLANCE METHODOLOGY

HIV sentinel surveillance was conducted as per NACO guidelines. HIV surveillance provides information on the current status of the infection in the community.

Its objectives are to:

1. Determine the geographical spread of HIV infection;
2. Monitor the trends of HIV epidemic;
3. Provide information for estimates and future projections of HIV/AIDS in the country; use such data to mobilize the national political and social leaders as well as to generate external support for the programme; and
4. More importantly, provide useful data for appropriate planning of health and medical care services.
5. Evaluation (indirect)

Since the primary objective of surveillance is to monitor trends in HIV infection over time and place, sero-surveys need to be conducted at repeated intervals using a consistent methodology in the same population group so as to demonstrate true change, if any, in HIV prevalence. Following epidemiological aspects need to be considered while designing the surveillance procedure:

(1) HIV infections are not uniformly distributed in any population. The distribution of HIV infection in the population depends on the prevalence of certain behaviours or practices associated with an increased risk of HIV infection;

(2) There are limited major modes of HIV transmission, and not everyone in the population runs the same risk of HIV infection; and

(3) HIV infections are introduced into different geographical areas and populations at different times.

Sentinel surveillance is the method of choice for obtaining data on HIV infection rates in various population groups and thereafter for monitoring trends.

HIV Sentinel Surveillance

HIV Sentinel surveillance is a cross-sectional study that can generate information on prevalence of HIV at regular intervals among selected groups in the populations known as "Sentinel groups". In other words, with HIV Sentinel surveillance, trends in HIV infection are monitored over time, by group and by place. HIV Sentinel surveillance can be either community-based or clinic/health facility-based; the latter is much more convenient and hence is always preferred.

Following procedures are used for the planning and implementation of HIV sentinel surveillance and for analysis of the data so obtained:

Planning

(a) Selection of the Sentinel population and sites

The first step towards the development of HIV Sentinel surveillance is the selection of the Sentinel population. The population is divided by transmission pattern into higher and lower risk groups.

Groups with higher risk behavior include:

(i) Those having sexual intercourse with multiple partners; for example, patients with sexually transmitted diseases.

(ii) Those sharing inadequately sterilized needles, syringes and other skin-piercing instruments, for example, injecting drug users.

An example of population groups with lower risk is pregnant women. However, it should be kept in mind that initiating surveillance in lower-risk groups might be relatively unproductive unless a critical level of HIV prevalence among those with higher-risk behaviour has been reached. Hence testing of pregnant women may not be very useful in low-prevalence States and should, as a general rule, not be carried out if HIV prevalence in higher risk groups is below 2%.

Pregnant ladies at any antenatal clinics are considered to represent general population. Truly speaking, HIV infected ladies are expected to be less fertile and therefore HIV estimates from ANCs are likely to be underestimates. The data collected from various sentinel surveillance groups is essentially based on opportunities available for blood collection in an unlinked and anonymous manner. From the ANCs blood is routinely collected for VDRL and haemoglobin estimations. Blood samples from these ladies are used for sentinel surveillance without linking identity of these individuals. This perhaps is the only group, which provides important information with respect to HIV prevalence in the general community in the country. In Tamilnadu almost every district has got at least 2 ANC Sentinel Surveillance Centres. In addition, some of the districts have an extra group in the age group of 15 - 24 to provide information with respect to recently infected women. The number of centres for 15-24 years are very few and sentinel surveillance with respect to age group 15 - 24 is introduced only for the last 3 years.

It is important to emphasize that data from donated blood screening should also be analyzed to get an indication of HIV prevalence in the

lower risk population. Although not a sentinel population per se, such data provides valuable information to monitor blood transfusion safety. The results should however, be disaggregated, where possible, by voluntary and remunerative donations.

(b) Sampling

Consecutive blood samples are collected till the predetermined sample size is reached over twelve-week period. Only new patients are included for collection of blood samples

Inclusion criteria for sampling in each risk group are defined in individual request forms for each risk group.

(c) Sample size

The minimum sample size required for surveillance purposes is determined for each sentinel site based on some assumptions. However such data at center level is unlikely to be available. Following sample sizes are considered appropriate for sentinel surveillance:

* Patients attending STD clinics (250 over twelve-week period).
* Injecting Drug users attending treatment clinics. (250 over twelve-week period.)
* Antenatal clinic attendees: (400 over twelve-week period.)

As the prevalence of HIV among antenatal clinic attendees is likely to be lower and change more slowly than in STD clinic attendees, a comparatively large sample size is required, i.e., 400 or more over twelve-week period. This sample size gives a greater precision, and thereby smaller changes in the prevalence rates can be detected.

(d) Testing Methodology

Unlinked anonymous testing method is used, as it minimises participation bias. In this type of testing, a part of the blood sample originally collected for other purposes is used for testing for HIV. For example, at an STD clinic, when blood sample is collected for VDRL, a part of it can be separated out and sent to the laboratory after removing all personal identifiers, viz., name, address, etc., so that the HIV test results cannot be linked with the individual.

(e) HIV Testing Strategy

For screening purposes 2 consecutive tests showing HIV positivity are considered adequate. For confirmation a 3rd test is necessary. For the purpose of sentinel surveillance only two tests are performed. Second test is performed only if the first test is positive. These two tests are of two different kinds for HIV antibodies.

Implementation

Every year, annual round of HIV Sentinel surveillance is conducted in designated Sentinel sites for twelve weeks from 1st August to 31st October.

(a) Data Collection

While every effort is made to unlink the HIV test result with the individual concerned, the data collection form for each serum sample includes the following information:

* General location of the sentinel site (not the name of the clinic);
* Population group;
* Month and year of serum collection;
* Age group;
* HIV laboratory test result.

For additional information, the formats are revised and made available to States, well in advance. Sufficient quantity of these forms is made available to all the sites and testing laboratories for use during the round. Adequate training is ensured to all the staff, with emphasis on changes in the formats.

Only a unique code number links the data collection form and the laboratory result.

(b) Storage and transport of blood samples

The specimen tube for HIV testing should contain a minimum of 0.5 ml. of serum. These tubes are properly labelled and stored in the freezer compartment of the refrigerator and sent to the HIV testing laboratory in batches of not less than 50 samples. If only a few samples are sent and tested, there will be a possibility of linking of that positive laboratory result to an individual.

(c) HIV testing

All sera collected at one Sentinel site are tested in the same testing laboratory at the same time, using testing strategy outlined under HIV testing strategy. As described earlier, care is taken not to test a "few" samples at a time because this may lead to potentially identifying individuals who might have tested positive. The intention is to make the tracing of the HIV testing results to the individual impossible.

(d) External Quality assurance programme

All the samples detected HIV sero positive by using Rapid HIV test kits are retested by using two ELISA test kits with different antigens or principles, in order to standardize the rapid HIV test kits results. The results are communicated to the respective testing laboratories immediately by the identified reference laboratories.

Of the samples tested during each round, 5% negative samples are sent to reference laboratories for confirmation of the results. Reference laboratories intimate a digit to the testing laboratory for sentinel surveillance for this purpose. The results for samples received are communicated to respective laboratories in 15 days time.

Analysis

Data collected at each HIV Sentinel site and for each sentinel group at that site are sent in the prescribed format as per the reporting schedule. The data are analyzed and compared separately to make meaningful interpretation. Primary data are the number of sera examined for a particular group at a particular site and the proportion positive for HIV.

Interpretation and use of Data

The HIV surveillance data are interpreted to assess trend of HIV prevalence in different groups and areas. This helps in determining which population groups need priority attention with respect to interventions and what differences exist between Sentinel sites. Also, surveillance data can be used to estimate how many people may be currently infected and how many are expected to develop AIDS in the future. The results of Sentinel surveillance are disseminated not only to those responsible for formulating policy but also to health care providers at the sentinel sites.

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